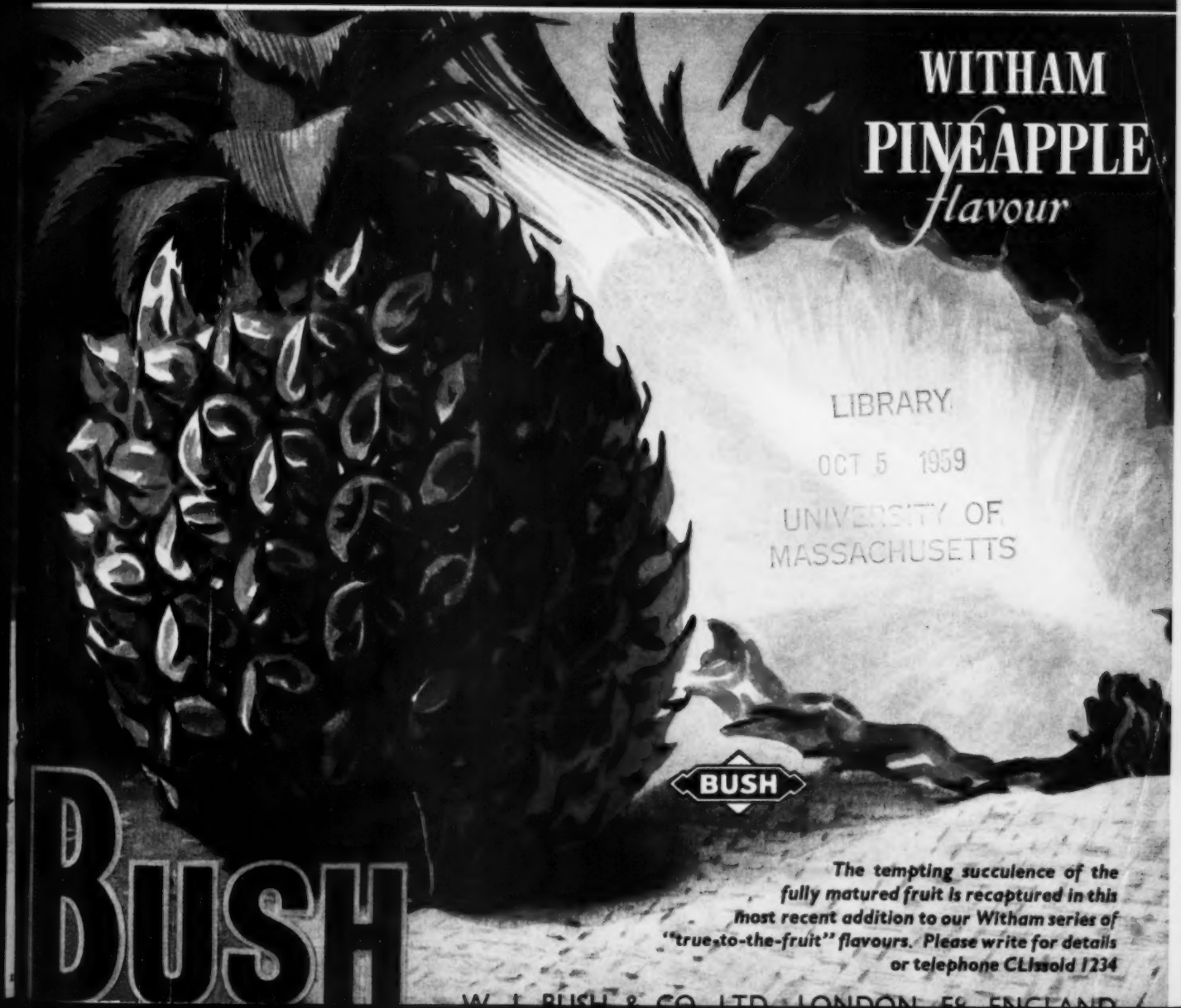
FOOD MANUFACTURE

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP SEPTEMBER 1, 1959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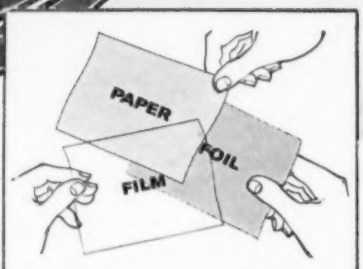

Light, compact and beautifully printed, laminations can combine the strength and rigidity of paper with the toughness and heat sealability of plastic film and foil. Many different material combinations are available in the form of reels or pockets which can be filled and sealed on high speed equipment.

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for meat paste, fish paste, chicken paste, confectionery, fruit squash, tomato sauce, mayonnaise, vegetable purée.

All are happy with this wonderful machine, which enhances the natural binding power of all meat, and ensures no separation of fat, all in a matter of seconds.

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It is simplicity itself to operate, easy to clean and needs only the minimum of maintenance.

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Australian user reports

Since we installed the Foodtech K.S. all our products have achieved a uniformity previously impossible with the usual mincers. Sales have gone up considerably thanks to this most economical machine and the high quality of its product.

U.K. user reports

Since K.S. machines have been incorporated in our production lines, skinless sausages have improved considerably in colour, and peeling is much easier. Pork sausages show excellent colour and binding, and luncheon meat and pies show improved texture and colour. These are undoubtedly the most profitable machines in our factory.

German user reports

I installed a K.S. in 1955 and have now four of these machines in operation. I cut out mincers altogether. The K.S. gave all my products uniformity, high binding power and texture. I am an extremely satisfied customer and I can recommend this machine to all my colleagues for economy and speed.

U.S.A. user reports

The K.S. Mincemaster gives a uniform proportion of meat to fat throughout every mix. It enables you to aim at, say, a 30% fat content and get it every time. There is no question of varying between 26% and 34% from batch to batch. This invariable high quality promotes sales confidence in the product and ensures better sales results.

For full details write to: **Foodtech Ltd.**

Queen Anne's Place
Bush Hill Park, Enfield, Middlesex
Telephone: LABurnum 6656/7

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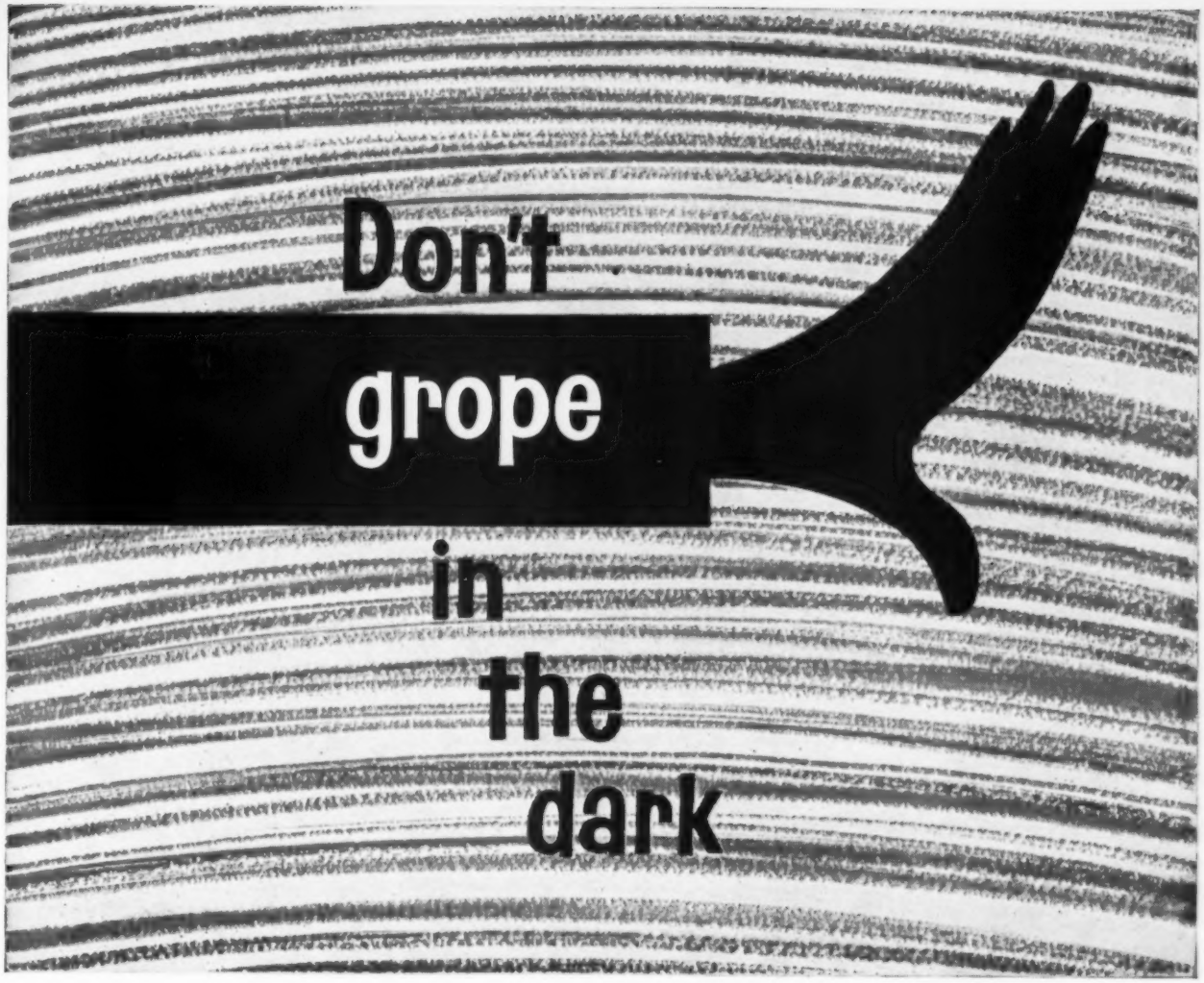

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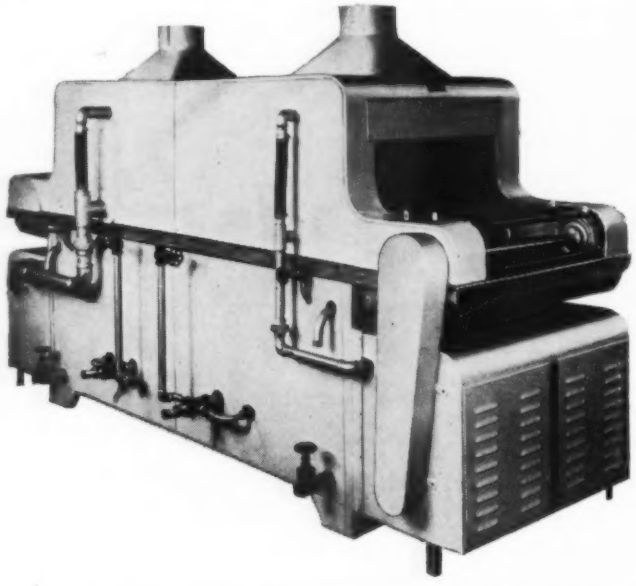

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For products cooked in the casing: Large Sausage, Black Puddings, Cooked Ham, etc. In clear, red, amber, white and black.

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Anything from an 8 oz. chunk to a 24 lb. ham! Excellent for self-service pre-packaging.

is your slice of the cooked meat market listed here?

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Skinless Sausages. Smoked Saveloys. Self-colouring in red, orange, cherry, light orange etc. for Frankfurters and Wieners; red for Polony, black for Black Pudding.

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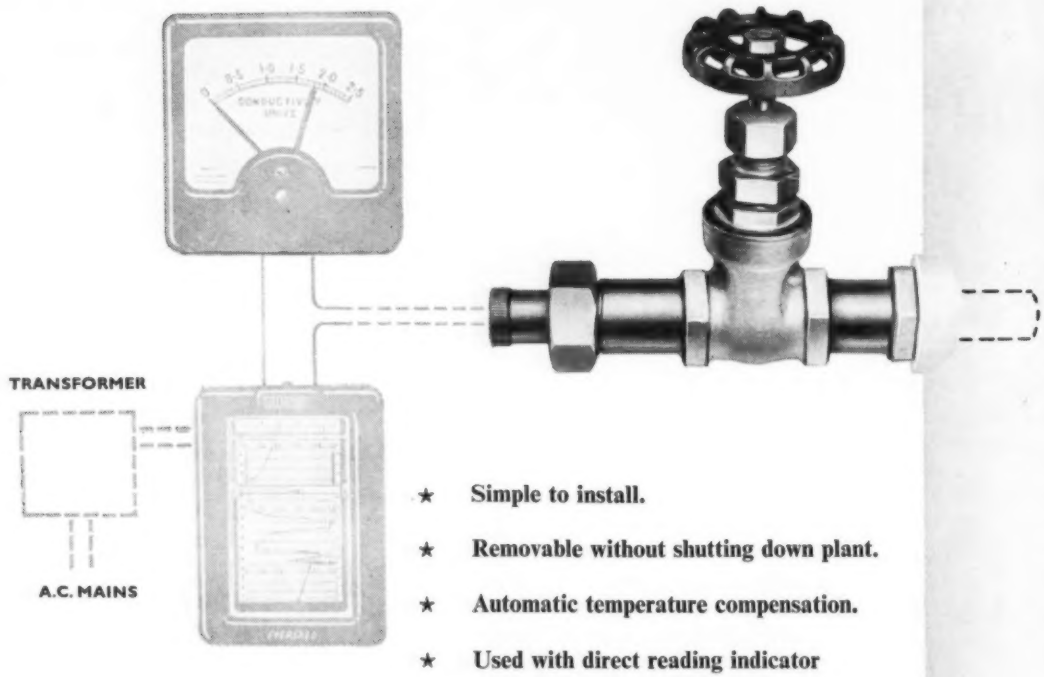

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September 8th to 18th, 1959–10 a.m. to 6 p.m.

THE INTERNATIONAL

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World's largest packaging display

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MACHINERY A large display of British and foreign machinery designed to improve every packaging operation at less cost.

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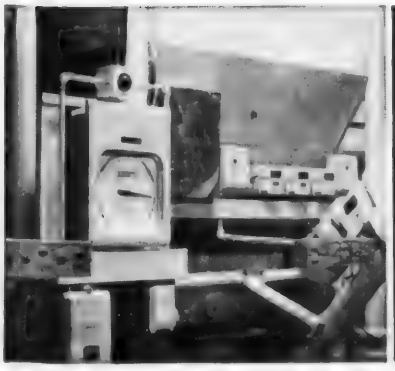
it says . . . . wonder what
they mean by that? . . . .

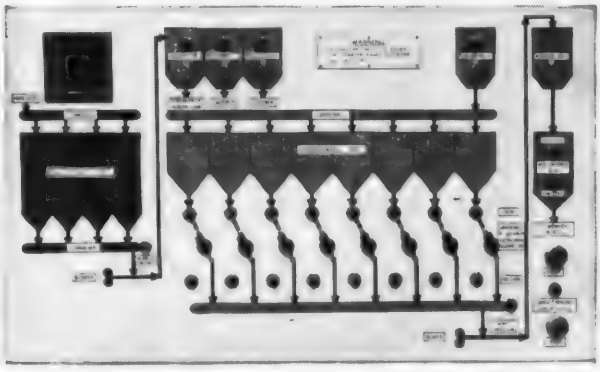
Yes, just what do they mean Mrs 'B'?
Fifty million mouths to feed
is the tall order that British bakers
take in their stride . . . the sort
of order that doesn't allow time
for "touching".
Flour at one end loaves at the other and
not a hand between—that's what we're really after.
Not quite there yet, but Elliott process control is
certainly a step in the right direction.

ELLIOTTS think about food



(*left*) Part of Elliott automatic flour weighing installation in a bakery of Messrs J. Lyons & Co. Ltd.

(*right*) Hopper Control Panel as supplied to Thomas Robinson & Son Ltd., for a large flour mill in Manilla.



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spiral chutes

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★ by the DENTOLITE PROCESS

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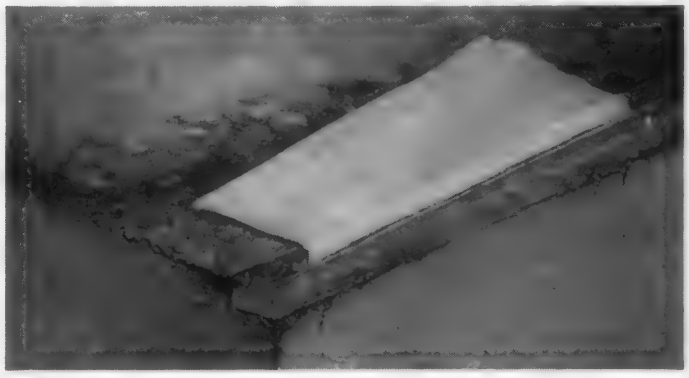

PROOF! Photograph of a ceiling partly painted with Fungi-Chek. Test shows heavy mould growth, but the Fungi-Chek is completely free of growth.

Fungi-Chek (Gloss, Matt & Emulsion) Paints serve two purposes:

(1) they provide a decorative finish par excellence, with first class durability and resistance to steam, abrasion, acids and alkalis, etc.

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This Poultry Processing Station of The Buxted Chicken Co. Ltd., Gordon Road, Buxted, Nr. Uckfield, Sussex, used Corrugated 'Perspex' to give plenty of good natural daylight. The installation was carried out by Atcost Limited, manufacturers and erectors of precast reinforced concrete buildings.

Corrugated 'Perspex' gives this Poultry Processing Station the best roof lighting in the world

BECAUSE: CORRUGATED 'PERSPEX' is tough. It is unaffected by the severest weather and withstands the corrosive atmospheres of most industrial areas.

CORRUGATED 'PERSPEX' is very light. It is pleasant to work with and easy to install.

CORRUGATED 'PERSPEX' lasts indefinitely. Many installations all over the country have been in use for over 11 years. Today they are working as efficiently as when they were first put in.

CORRUGATED 'PERSPEX' has a very high light transmission. Once installed there is an immediate saving on artificial light.

CORRUGATED 'PERSPEX' is made in a wide range of profiles to fit most corrugated roofing materials. If diffused daylight is desired, Opal Corrugated 'Perspex' is available.

It's as clear as daylight – it must be

CORRUGATED 'PERSPEX'

'Perspex' is the registered trade mark for the acrylic sheet made by I.C.I.

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CP.156

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independent NORTHERN COLD STORAGE LTD.

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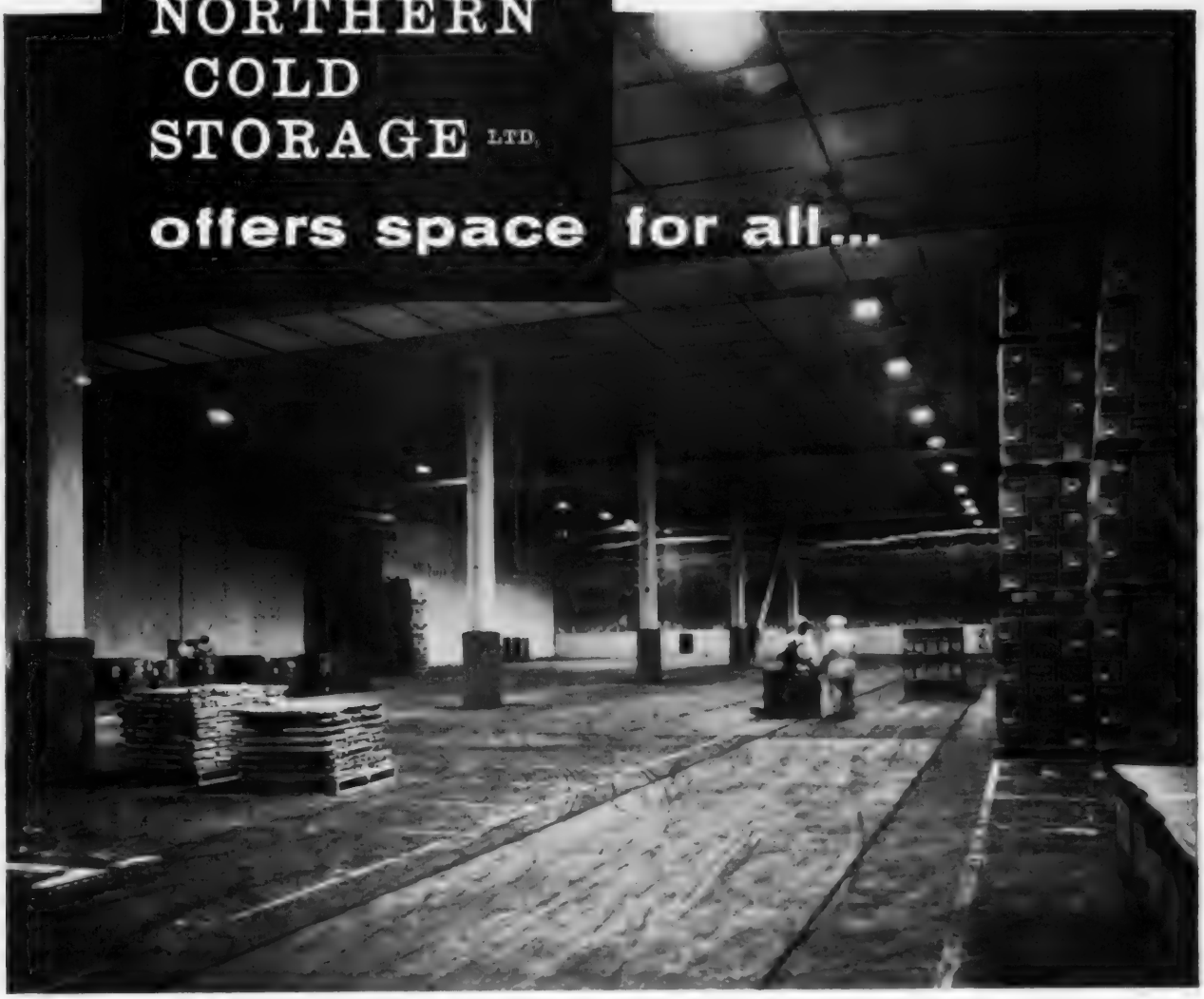


Spaciousness A spacious yard, and loading bays for 20 large vehicles, give immediate access to the store. There's no queueing in congested roads. Result — quicker turn-round for vehicles. The Northern Cold Storage building is well away from the Grimsby docks, yet it's within 10-15 minutes of the quayside.

Great Simplicity The store has been sited and laid out to allow traffic to flow freely, rapidly, simply. It is on Ladysmith Road, which connects with all trunk roads to and from Grimsby. Merchandise is unloaded straight into the store. In just 15 seconds the pallet load is within the refrigerated area. There's no waiting outside in sunshine or rain.

Speedy Handling Modern handling methods with fork-lift trucks governed the design of the store. Skilled operators, trained to handle frozen food, move merchandise by the ton - and move it fast. A job which would take 2 or 3 hours manually can be done in 20 minutes by fork-lifts.

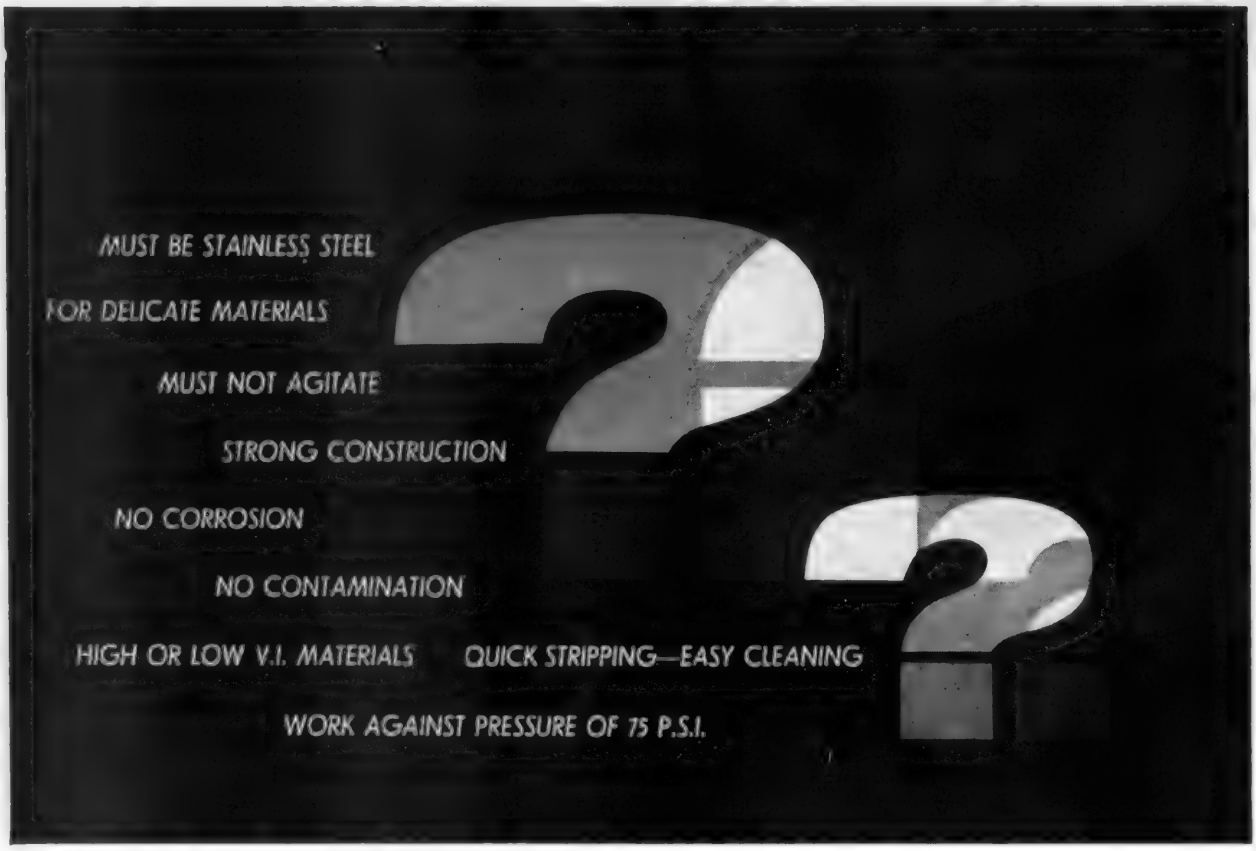
Low Temperature A storage temperature of 20°F protects all frozen foods. Northern Cold Storage guarantee a steady low temperature.

Safety The refrigeration machinery was made under Lloyd's Supervision, and passes their most stringent safety tests.

Independence Northern Cold Storage Limited have no affiliation with any frozen food concern. It offers its services to all customers equally.

A modern high-quality cold store for high-quality frozen foods

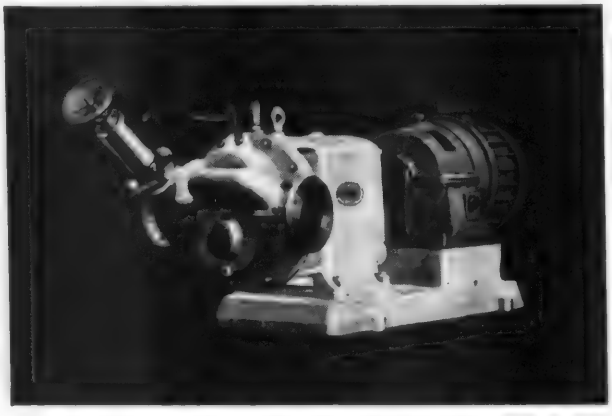
NORTHERN COLD STORAGE LIMITED · LADYSMITH ROAD · GRIMSBY · TELEPHONE: 56031-4 · TELEX 52243



IS THIS YOUR PROBLEM?

THE HOWARD 'M' TYPE All Stainless Steel Positive Rotary Pump is a robustly constructed piece of machinery especially designed to solve difficult pumping problems. It handles delicate materials—even those with a high V.I.—without any agitation or contamination. The pump can, when necessary, be jacketed for heating, or cooling.

NO CORROSION OR CONTAMINATION: Constructed throughout in stainless steel all bearings are external to the pump chamber to avoid contamination of the material being pumped.



V.I. VERSATILITY: The 'M' Type will handle high or low V.I. materials with equal ease and efficiency. For high V.I. materials the specially designed rotors and the large suction and discharge passages assure an easy, streamlined flow.

EASY MAINTENANCE: Cleaning the 'M' Type is a quick and easy process. For cleaning, the Rotor Case and Rotors are removed from the body of the pump. Stripping and reassembly are made much easier by the use of special type wing nuts which hold complete Rotor Case and Pumping Head in position.

MANY USES: The 'M' Type Rotary Pump is exceptionally versatile. It is available in seven sizes, giving from 15 to 15,000 g.p.h. for heads up to 200 ft. It has found wide and varied use throughout the food and chemical industries.

if so—the answer is a

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'M' TYPE ROTARY PUMP

ALSO MANUFACTURERS OF HOWARD TRIPLEX, CENTRIFUGAL AND PROPORTIOMETER PUMPS

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Telegrams: Korkanseal, Lesquare, London.

Bottles sta

My dear, you'd never *dream* what trouble I've had with Roderick lately. He's had bottles on the brain. No, dear, *brain* — not train. One night he sat bolt upright in bed and chanted (positively chanted):— *Bottles stand on their caps.* Just like that. Then a lot of rigmarole about juice all over his factory floor. Sticky situation. Send for Production Manager. Send for Foreman. My dear, I was nearly sending for a Harley Street headshrinker, by that time. Oh, he's all right now. Something called United Glass. No, not a wonder-drug, darling. They make both bottles *and* caps. Closures, Roderick calls them. *Closures*, not roses, dear. Roderick says the cap always fits when you buy bottles from United Glass. And as I say to Roderick, if the cap fits, wear it . . .

United Glass is the only British maker of bottles with its own closure division. And it's the only company with as many as eight bottle factories. They supply bottles to thousands of customers for a wide range of products. The Glass Packaging Advisory Bureau, set up by United Glass, will be glad to advise you on all your glass packaging problems. Please get in touch.

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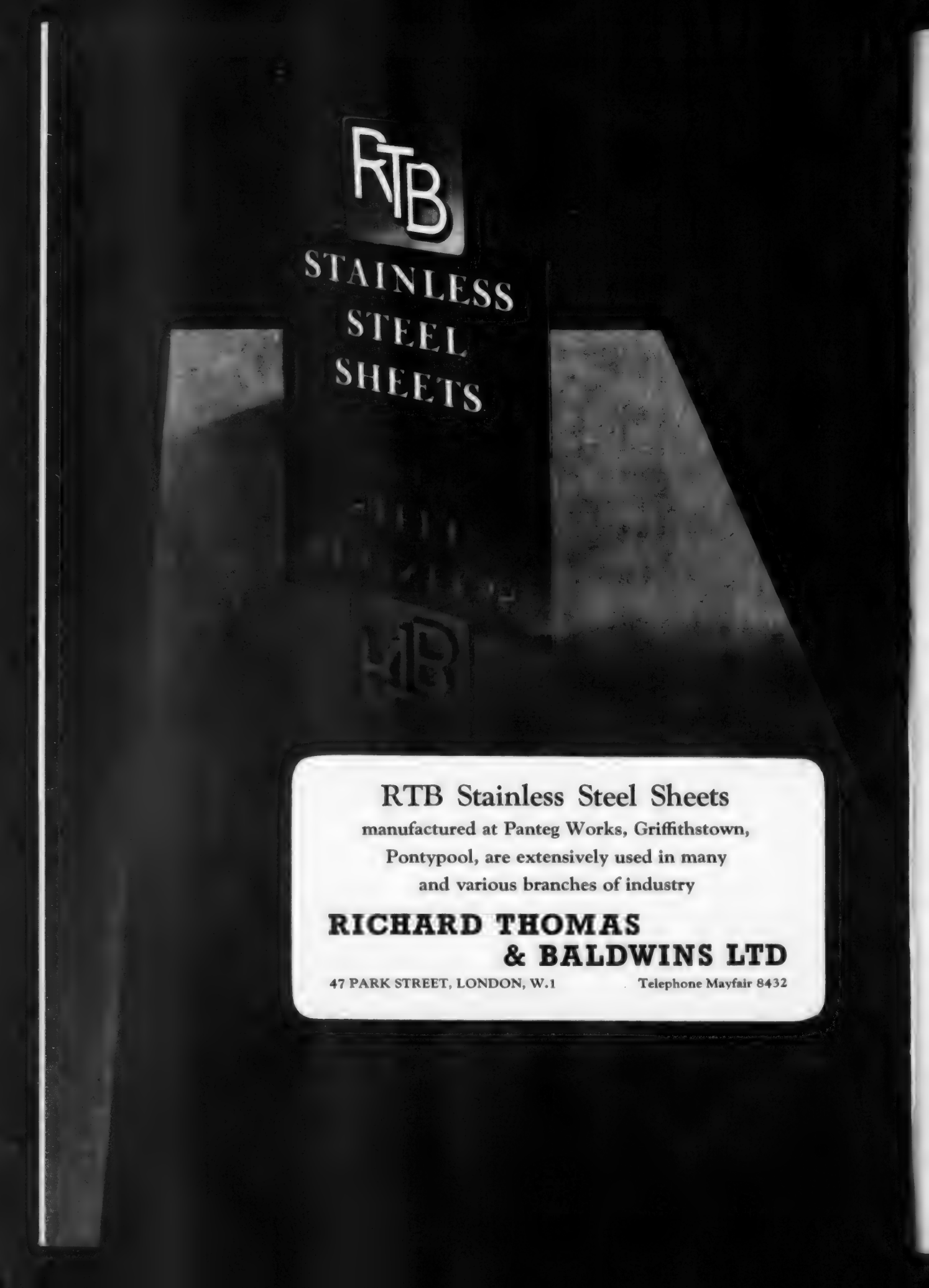

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A manufacturer ran into mechanical trouble with a packaging machine using transparent film. He phoned us and we sent an engineer from our Machine Development Section. Soon our photo-unit was slow-motion filming the offending machine in colour. The ciné-film was studied by all concerned, and the faulty action diagnosed. Within days we were helping the makers of the machine to carry out the necessary modifications.

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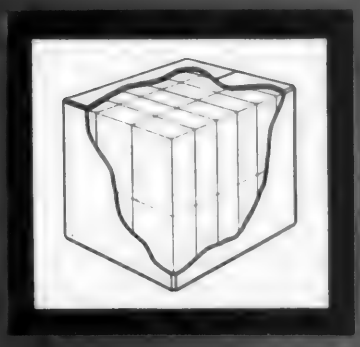

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"WE SAID WE'D DO IT— AND WE DID!"

Q. Frigidaire's Five Point Development Programme for Commercial Refrigeration has been in operation now for two years. How is it progressing, Mr. Porter?

A. I'm proud to tell you it's going very well indeed.

Q. How does it directly affect those of us in the Commercial Refrigeration business?

A. In many ways. Let's consider the five points of the Development Programme. No. 1 is Production and Development. No. 2 Sales. No. 3 Sales Service. No. 4 Training and No. 5 Export. Under every heading we have made great strides which will benefit *you*.

Q. Could we take No. 1—Production and Development first, Mr. Porter?

A. In 1957 I said that in three years we planned to expand our production by 50% over the 1956 figures. *Well, we've beaten our own target. We did it in two years!* By June 1959 we had increased the annual output of Commercial Refrigeration equipment by 50.6% over the '56 figures.

Q. And what about Development?

A. Very satisfactory. Between June 1957 and May 1958 we produced *twelve* new commercial products—one a month. That's good going! Then between June 1958 and July 1959 we added nine more. These new products range from Dehumidifiers to self-service display equipment. We have just acquired additional large premises adjoining our plant at Hendon. They will house our new completely integrated research unit and will provide even greater facilities for design and engineering. The most up-to-date equipment will be installed including a unique electronic control panel for centralised temperature recording. These developments mean a continuing flow of better and lower priced products for you.

Q. Let's take point 2—Sales. How have they gone?

A. Again we have beaten our own target. I said we'd do it and we did. In 1957 we were already the leading manufacturers of refrigerating equipment in Great Britain. Now we have further increased our lead in the industry.

Q. No. 3 Sales Service—are there any new developments?

A. Yes. Frigidaire was the first manufacturer to give a five year warranty on commercial compressor units. Well, *we're now extending the five year warranty to cover the motors as well on all Frigidaire commercial condensing units under 5 horsepower. And*—we're pleased to announce *sweeping price reductions* up to 10% on condensing units and evaporators. We are also reducing prices on our very popular Frozen Food Display Cases. You see how our achievements benefit you in a practical way. We are also continuing and expanding our Self-Service Advisory Bureau, and are arranging Self-Service demonstrations around the country.

Q. This brings us to point No. 4. With production and sales rising are you increasing your Training?

A. You remember I said in 1957 that we hoped to provide a Frigidaire Viso-Trainer free to colleges in the U.K. offering full-time courses in Refrigeration. We have done that. Those colleges have already got them. We have stepped up our training of service engineers—over *400* men have been given extra training at the factory in the past two years. And as a further part of our development plans, we have enlarged our Sales and Technical Training Staff, whose job includes the organisation of lecture tours throughout the country. Thus our Sales, Technical and Service staffs will be even better equipped than before to help with your problems.

Q. And how is Frigidaire faring in the Export Market, Mr. Porter?

A. In the face of very severe competition we have made progress. We have been particularly successful with our low temperature ice cream conservators and display cases. We've increased exports of these by 51% in the past two years.

Q. Then undoubtedly you feel that, so far, the Five Point Development Programme is a success. What of the future?

A. What I've told you is only the beginning. Every day we are seeing new developments. We are ahead in all aspects of Commercial Refrigeration—*and we shall stay ahead!* Our slogan: "Frigidaire means BUSINESS for YOU!" is no more than a simple statement of *fact*. All Frigidaire users know that. They know that it's going to mean even better business in the future—for them and for us.

FRIGIDAIRE

REGD. T.M.

FRIGIDAIRE DIVISION OF GENERAL

Frigidaire's General Manager reports to you on the achievements of Frigidaire's "Five Point Development Programme for Commercial Refrigeration"

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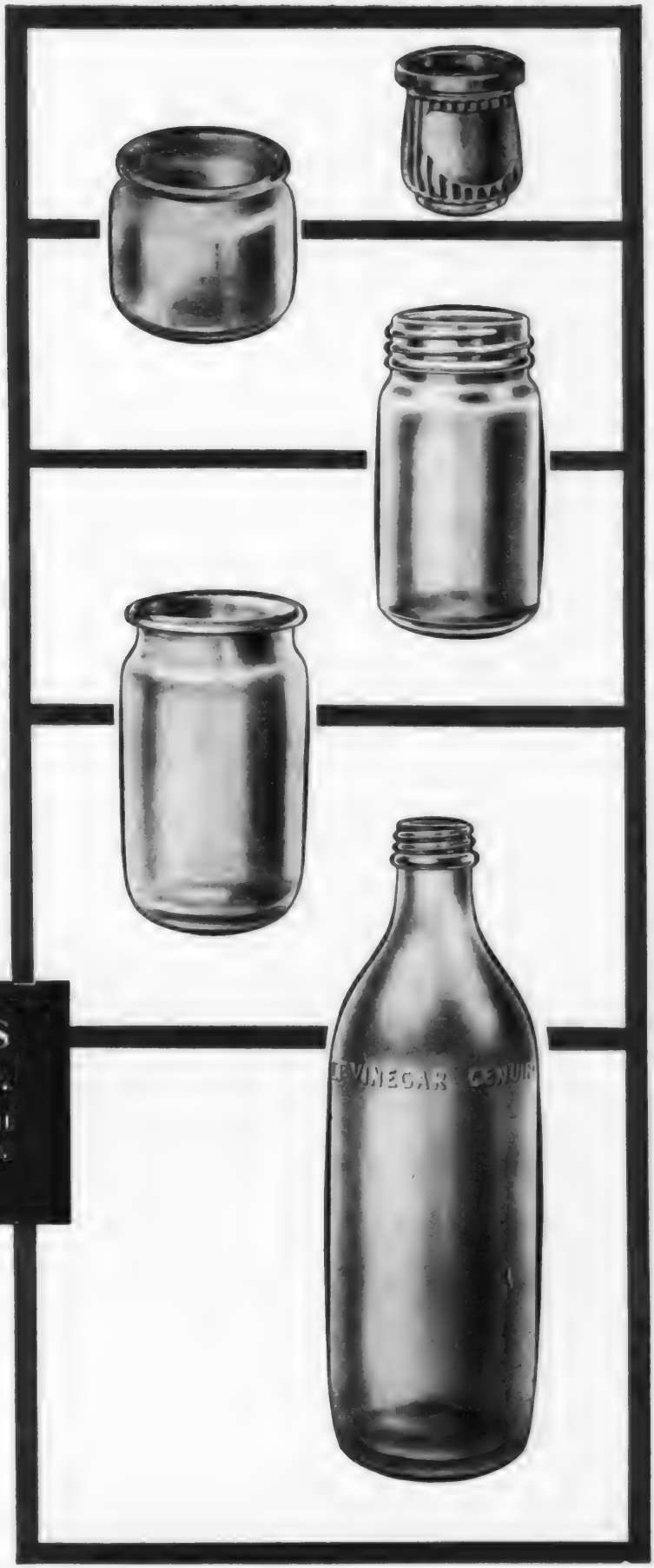

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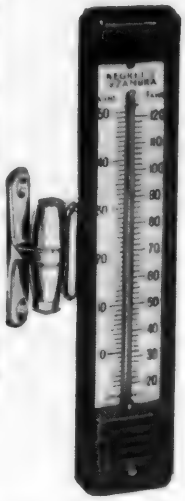

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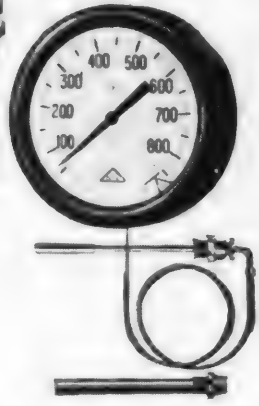
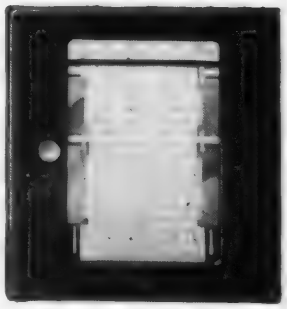
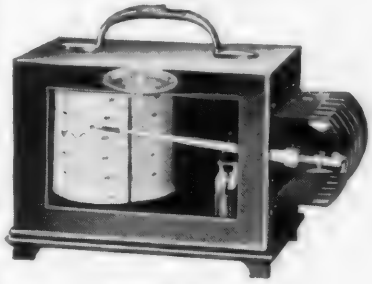


Distance-type Mercury-in-
steel Dial Thermometer



Resistance Thermometer
Recorder



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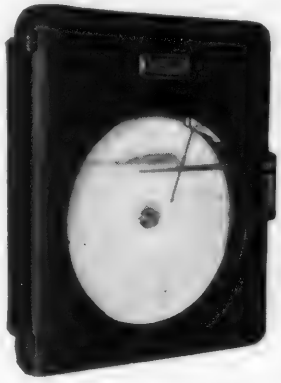

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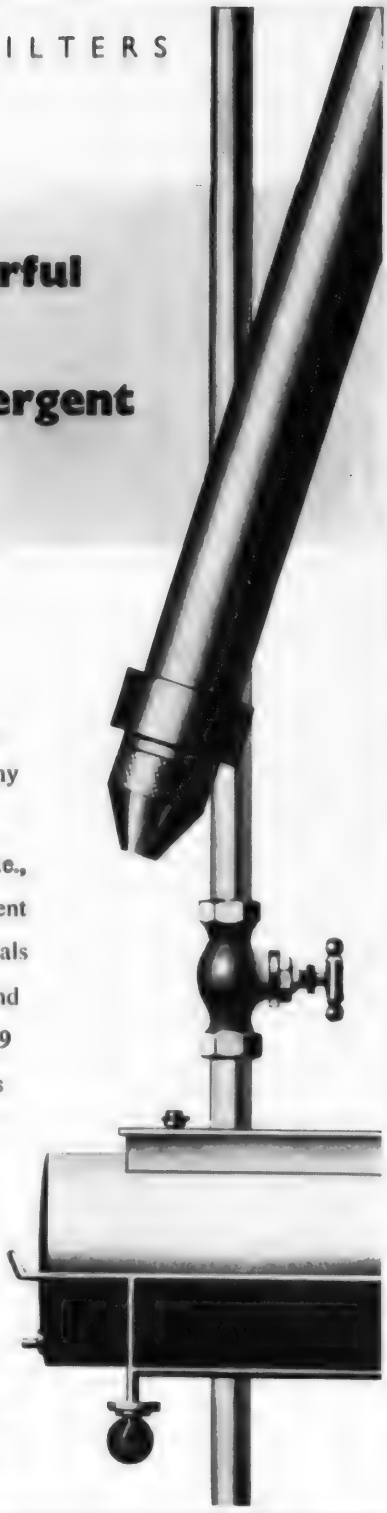

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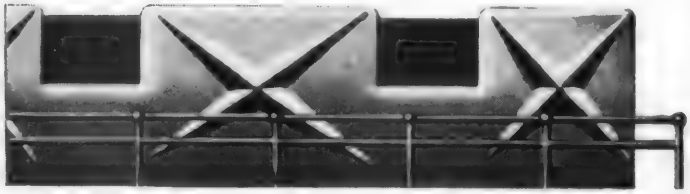

Please send me further details of B.H.C. 318.

NAME OF FIRM .....

ADDRESS .....

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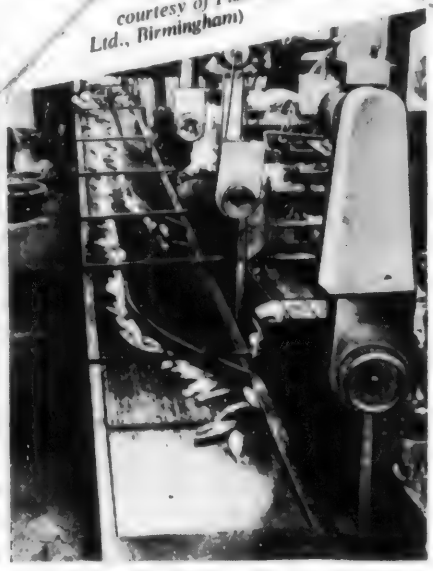
Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

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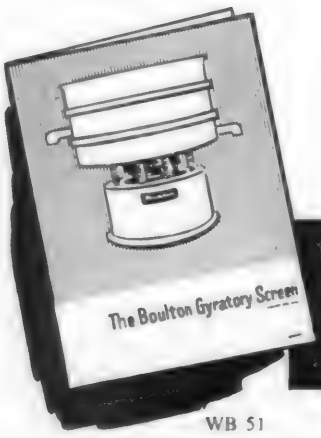

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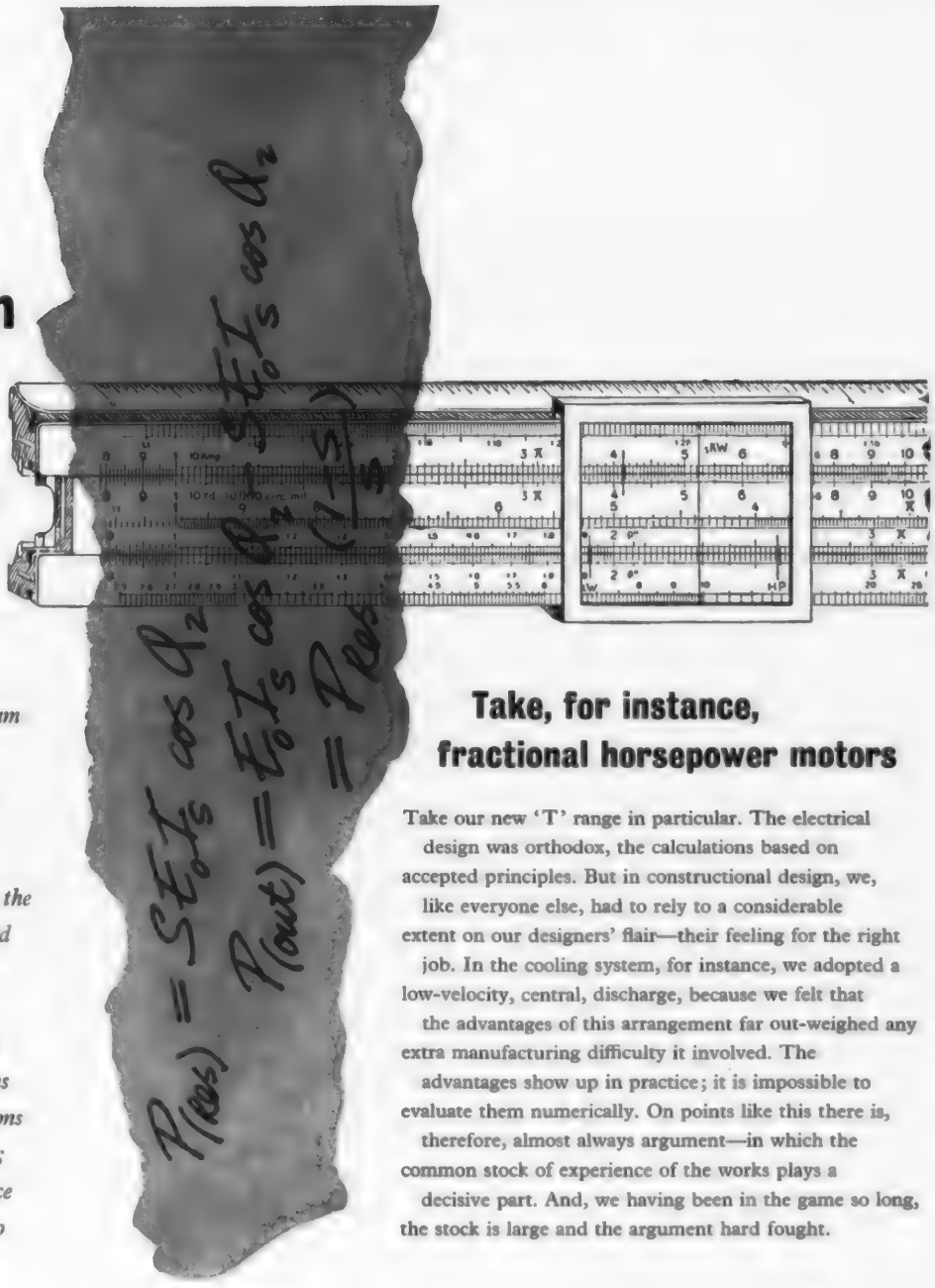

The first steps in design are usually mathematical; the determination say, of the optimum of active material required for a given performance. Here the designer depends on his knowledge of the most recent work on electromagnetic theory, the potentiality of new materials and new techniques. Every designer must keep abreast of such developments. But as the design proceeds he has to make decisions of a different kind. These decisions will depend on direct experience; on knowledge obtained in practice and too complex to be reduced to a set of equations. This plays a vital part in design.

Take, for instance, fractional horsepower motors

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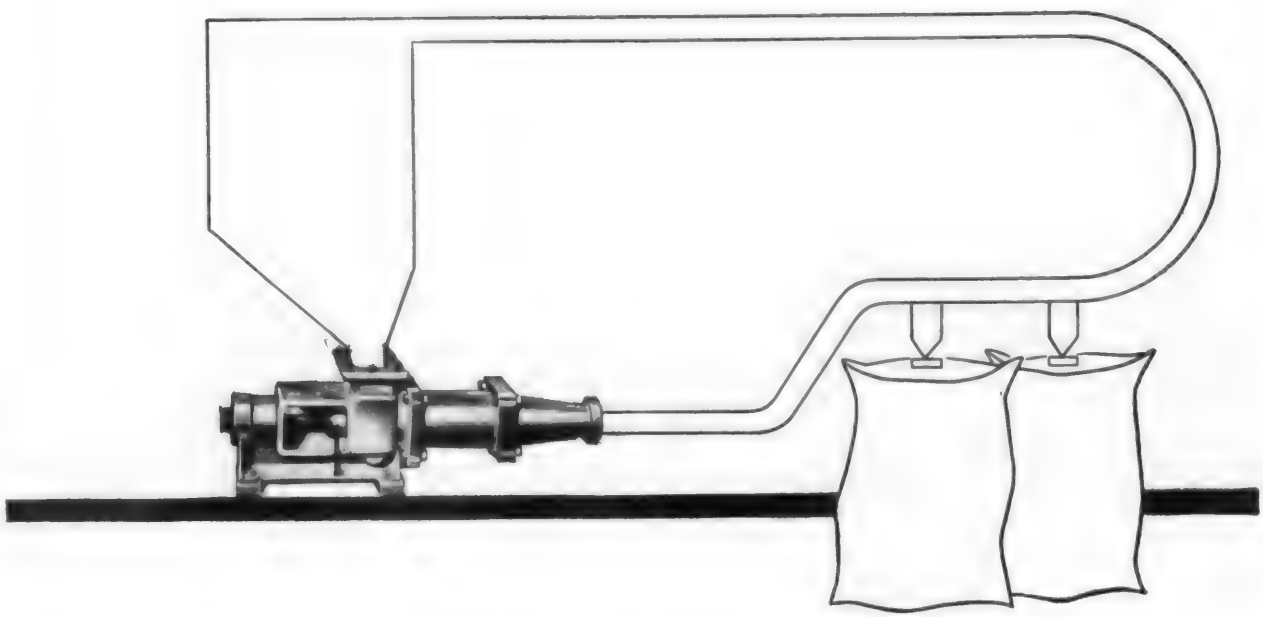

Ring main systems for pumping fluids to various stations are commonplace but have you thought of piping powder to controlled draw-off points?
Over many years the Powder Division of Mono Pumps Limited has obtained a mass of valuable information on the behaviour of piped powder and the Mono Powder Pumping System is a fully developed and compact system.
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Call us in, we'll take the load off your mind!

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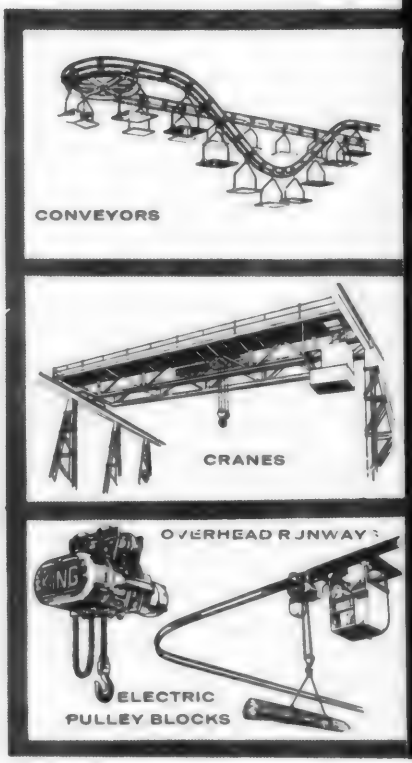

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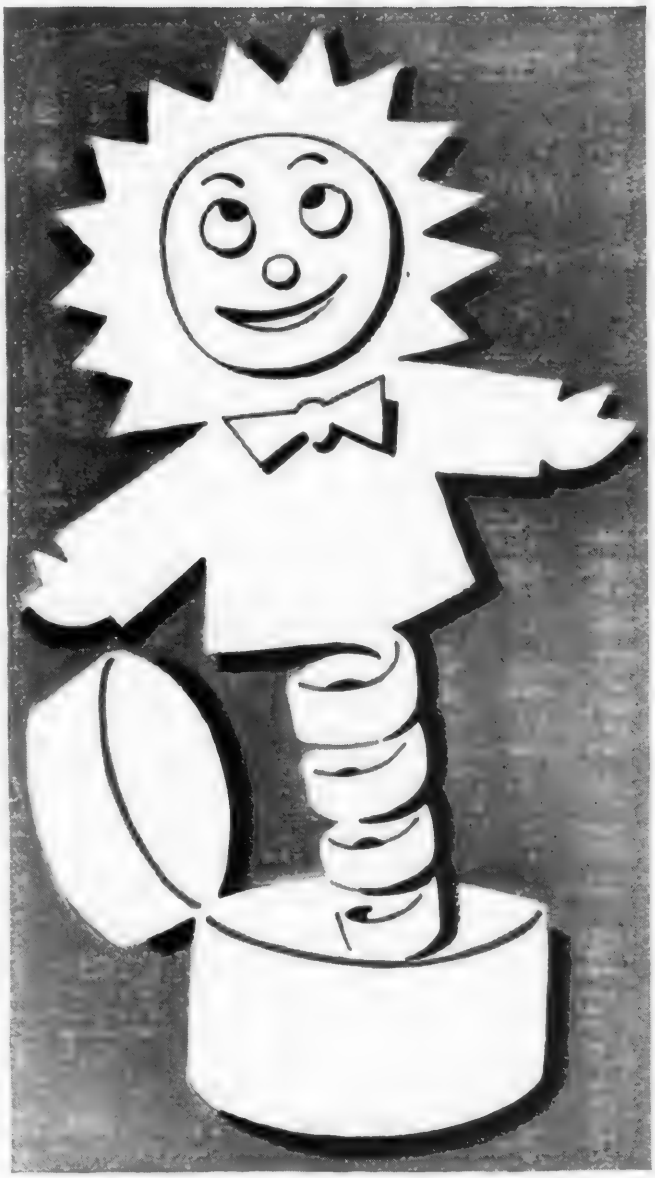

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There are two sorts of surprises: the nice ones and the other kind. Box-taint belongs to the latter category. Avoid it one must when packing sensitive products. It is not surprising, therefore, that wise box-makers choose SCANDINAVIAN pure folding box board. For SCANDINAVIAN, made only from virgin spruce wood pulp, has all the most desirable properties and *none* that could taint the most sensitive product. It combines lightness and whiteness with remarkable rigidity and an excellent printing surface. And (pleasant surprise) it's not so expensive as you might expect. Ask for details.

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Ask your boxmaker or agents of the FINNISH, NORWEGIAN AND SWEDISH FOLDING BOX BOARD MILLS OR WRITE TO THE INFORMATION DEPT., P.O. BOX 7232, STOCKHOLM 7

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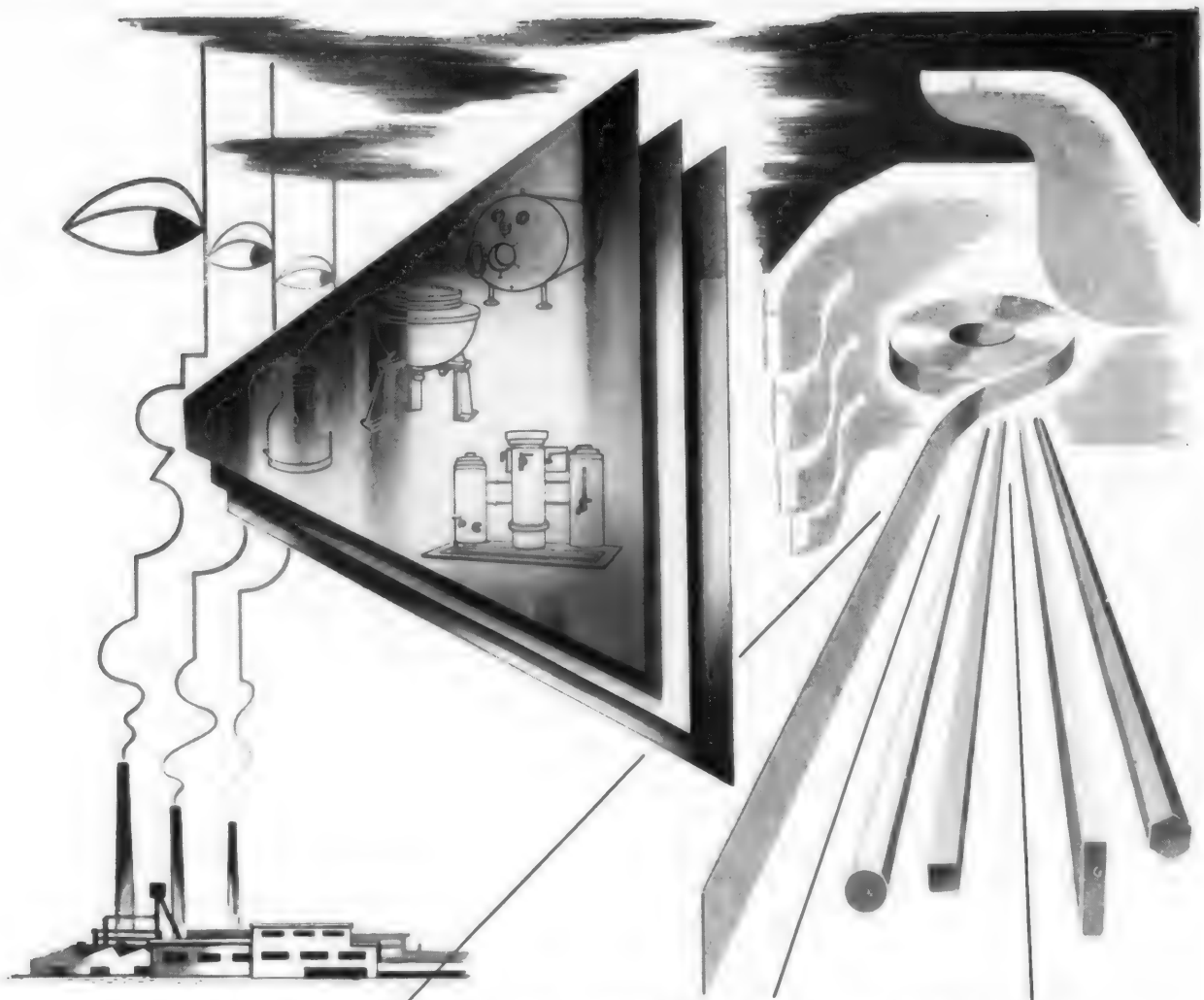

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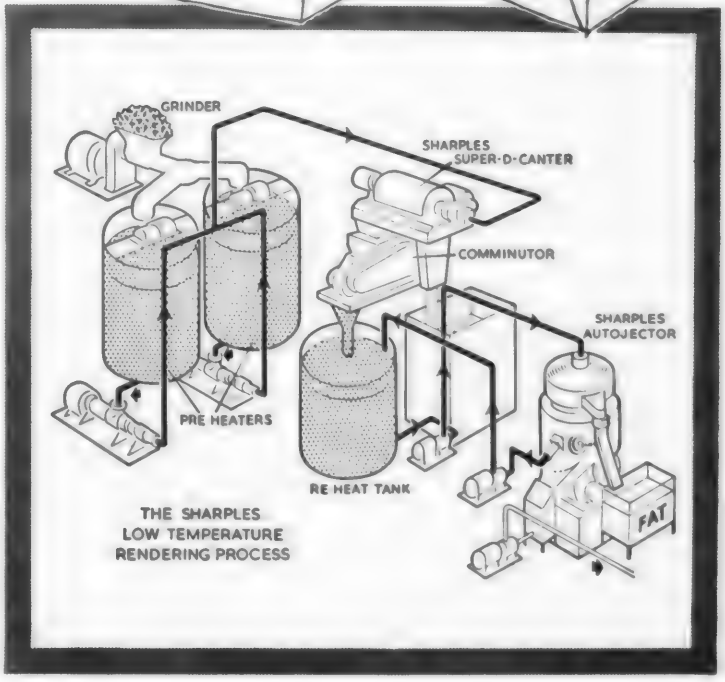

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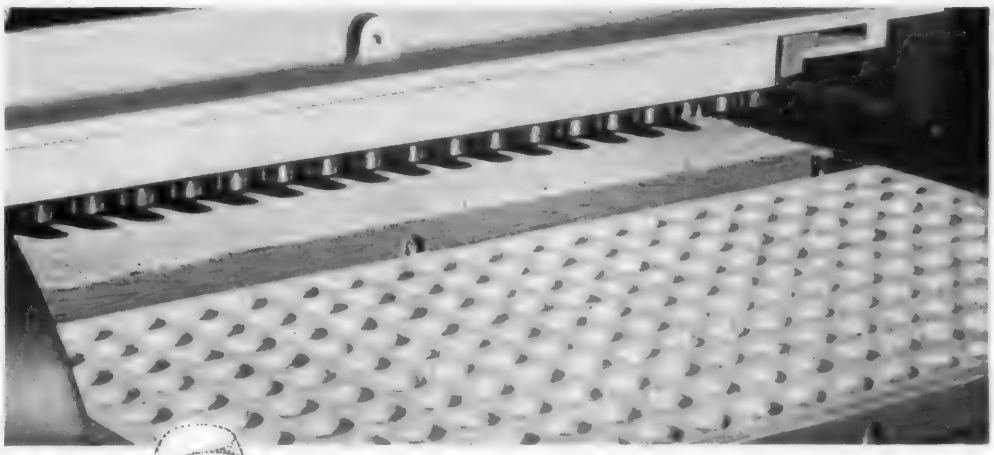

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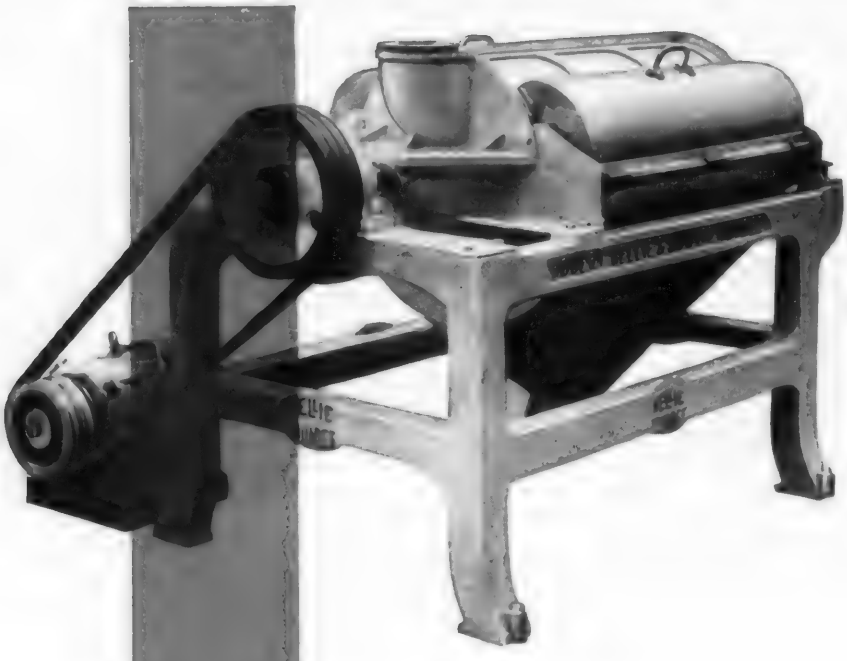

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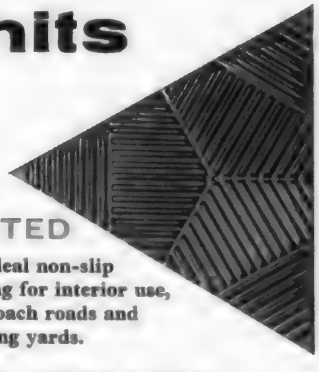

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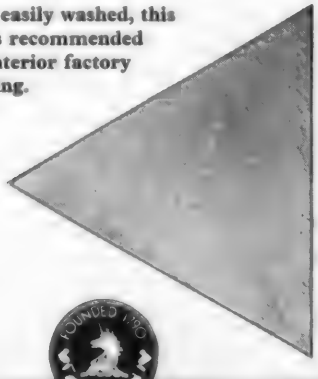

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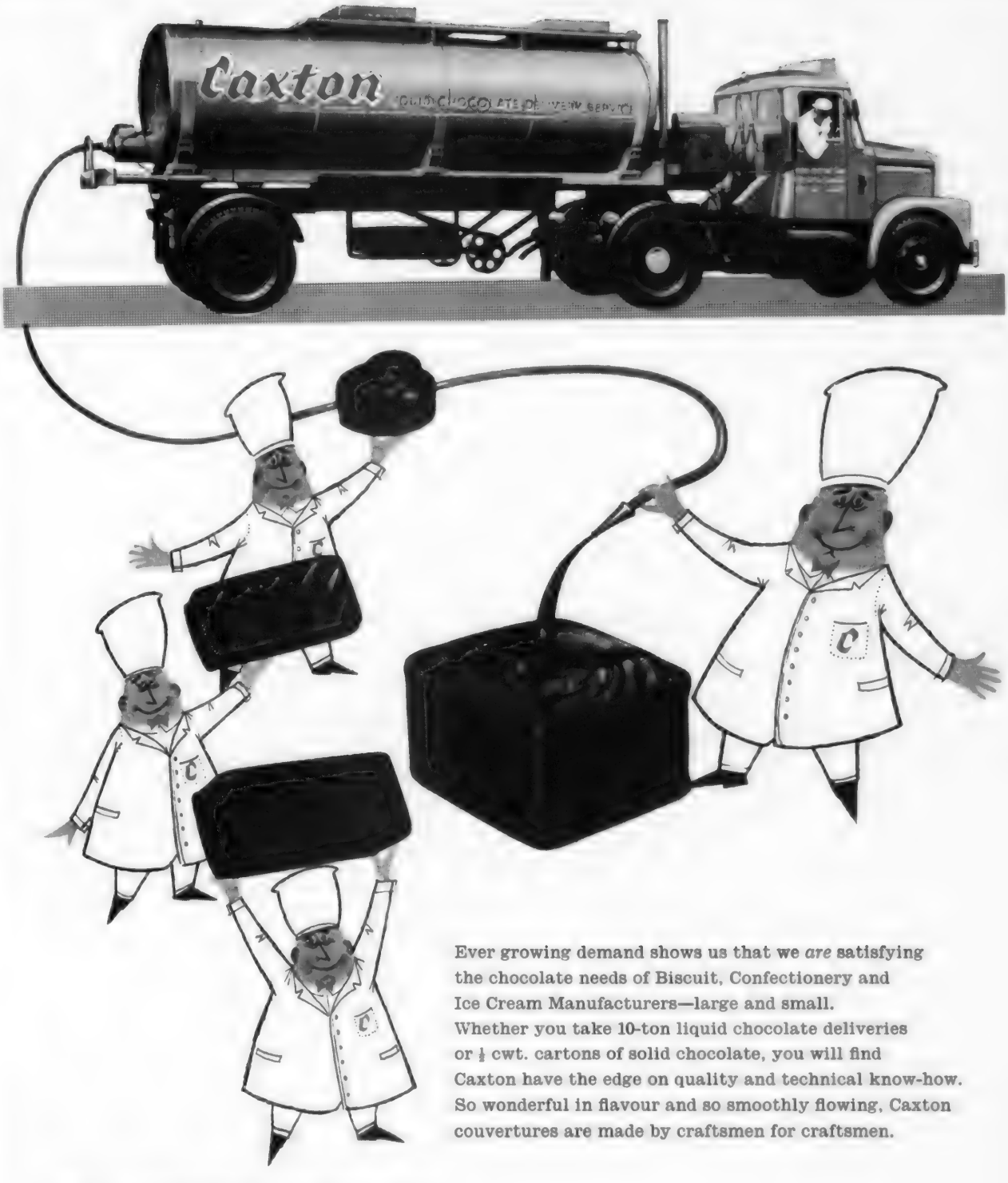

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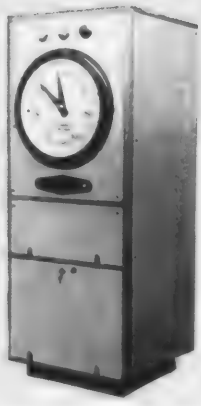

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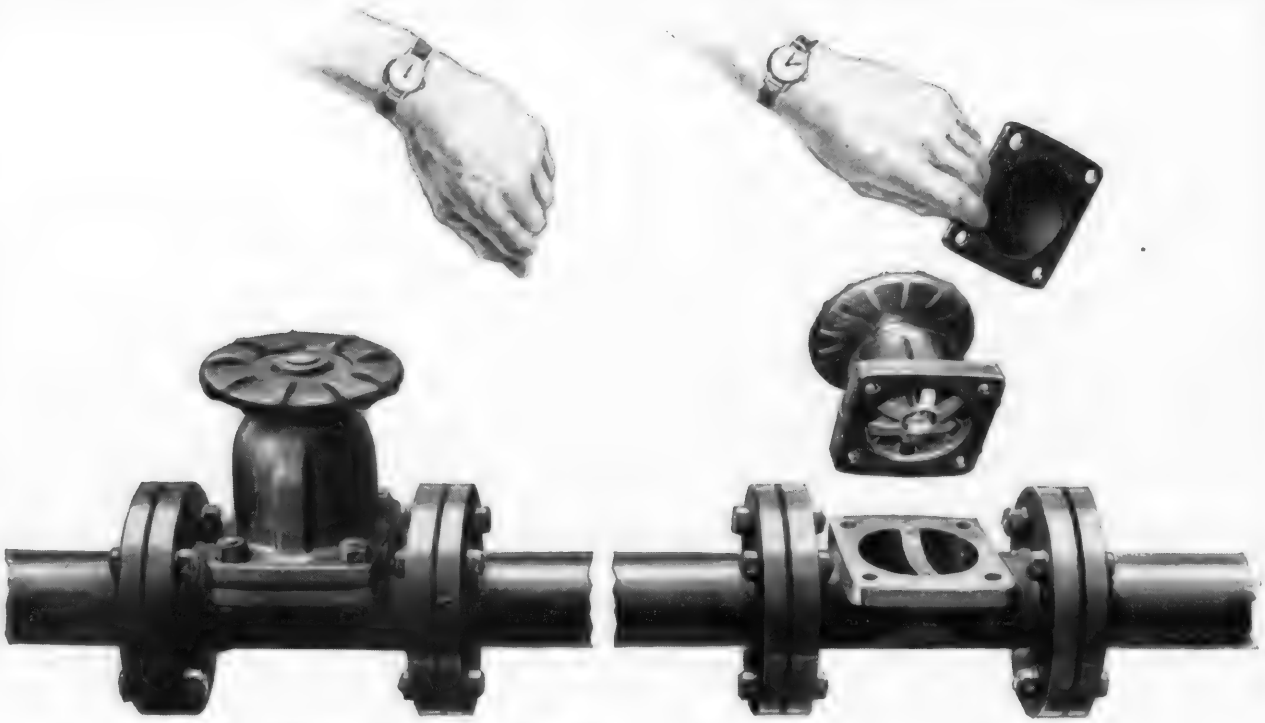

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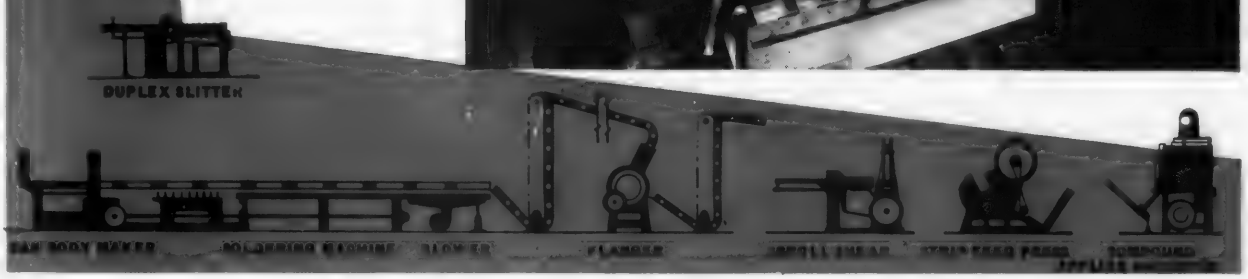

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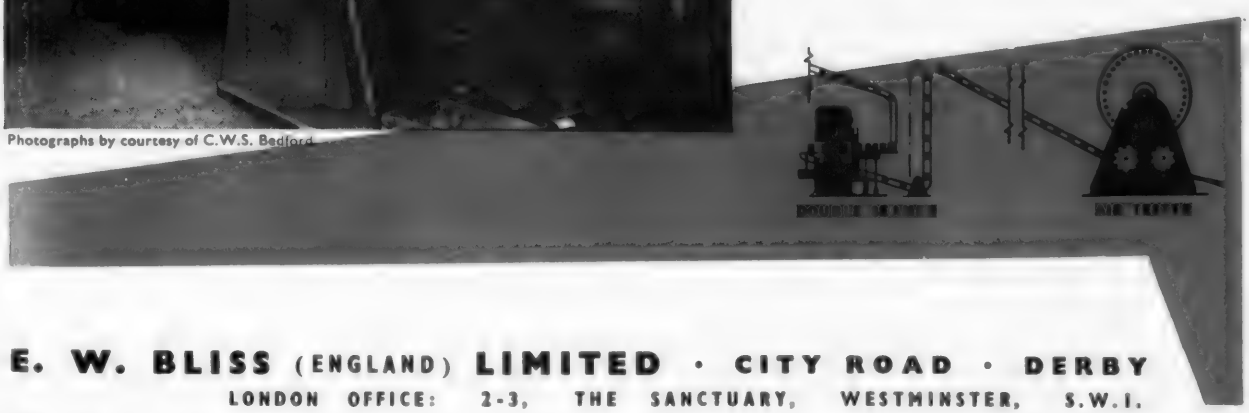

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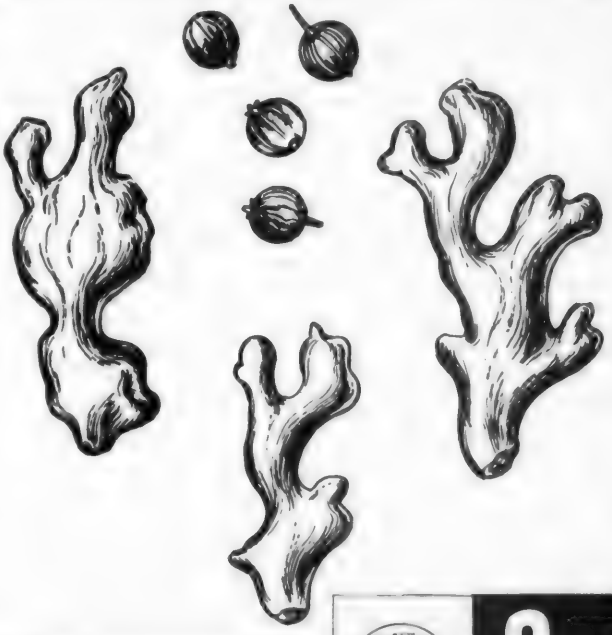

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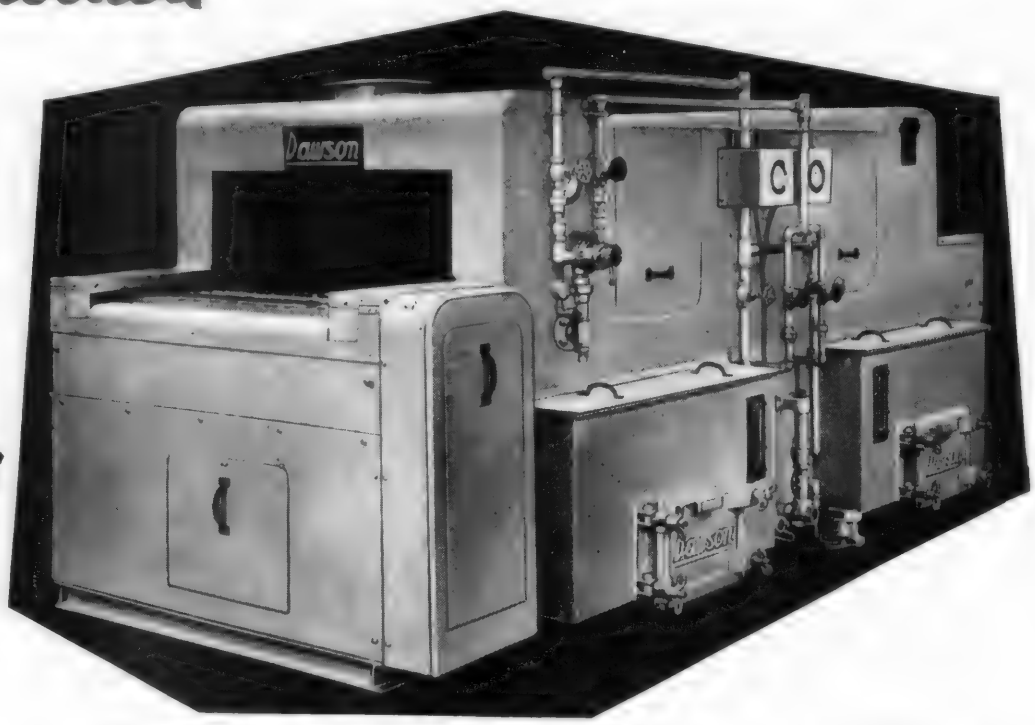

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Carmarthen Road, Swansea, Glamorganshire Telephone: Swansea 51571 Telegrams: Welshplate, Swansea

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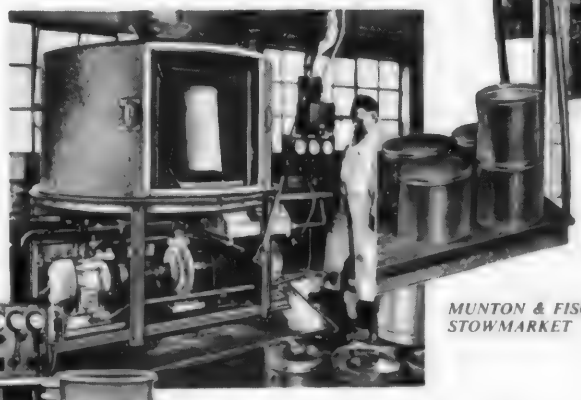

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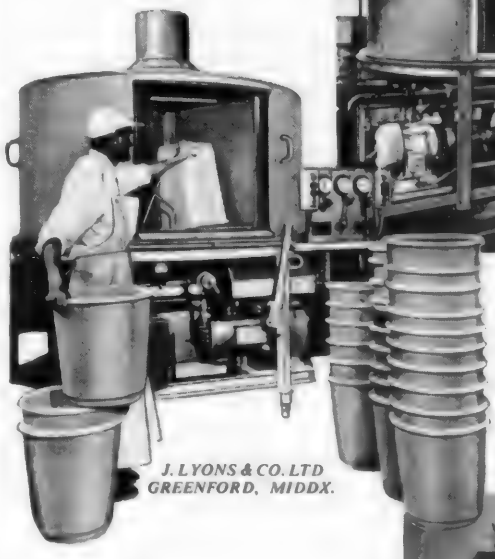

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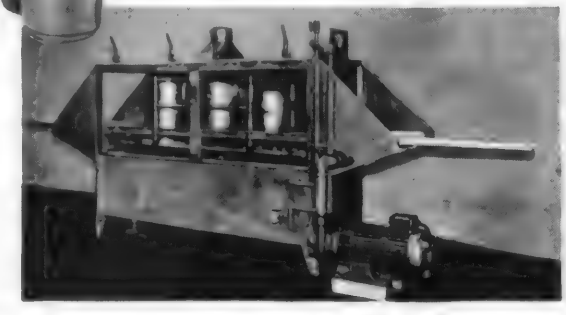

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Moisture costs money as it slows down production, causes deterioration in quality and increases plant maintenance. Birlec Direct Dehumidifiers—simple, reliable and economical—are maintaining low humidity conditions for many products, including chocolates, sweets, biscuits, pharmaceuticals and even antibiotics.

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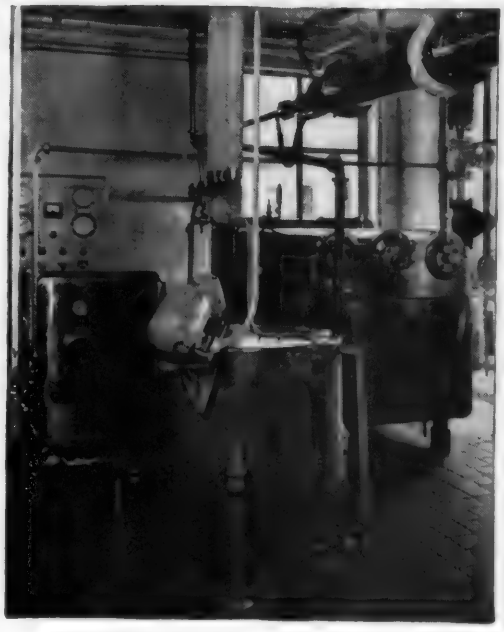

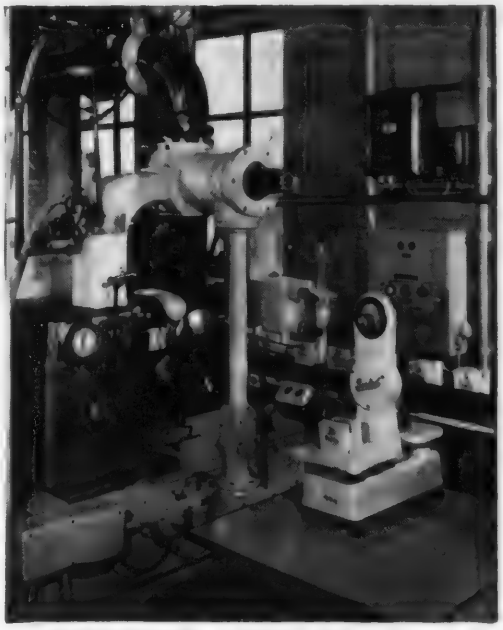

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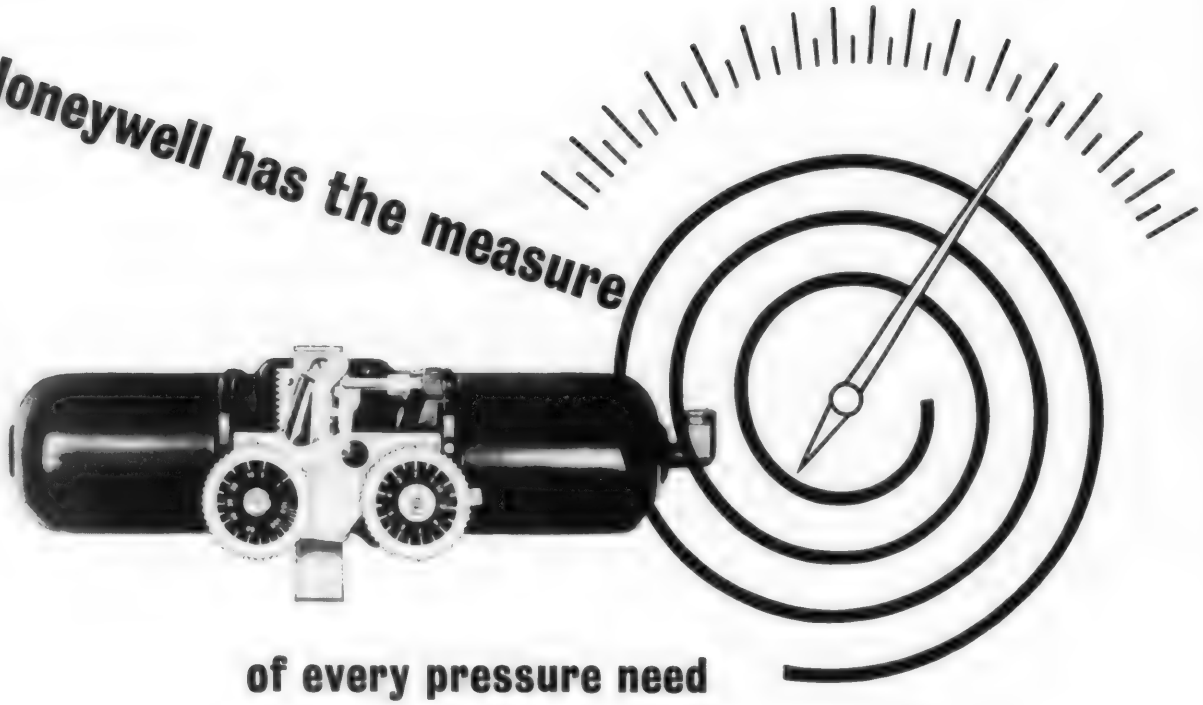

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FOOD MANUFACTURE

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Number 13 September 1959

Hydrogenation (No. 2)

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This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

VEGETABLE Oils are hydrogenated by bringing them into intimate contact with hydrogen gas at suitable temperature and pressure.

The oil is heated to 120°–180°C in a closed vessel containing hydrogen under pressure, and contact is brought about by vigorously stirring the oil or by passing the hydrogen through the oil in fine bubbles, in the presence of a catalyst.

THE CATALYST

A catalyst is a substance which assists a chemical reaction without taking part in it. The catalyst is Nickel, which is deposited on to Keiselgühr in a very finely divided state.

The method of preparation and deposition of the catalyst is very important because it influences both the activity of the catalyst and the selectivity of the chemical reactors.

Certain impurities such as sulphur or carbon monoxide in the hydrogen or oil will cause a rapid decline in the catalyst activity.

An active catalyst in optimum concentration in the oil, will tend to cause the selective hardening of the more unsaturated acids, whilst an old or 'poisoned' catalyst will give random 'non'-selective hardening of all unsaturated acids.

Again a very active catalyst working on the 120° - 140°C range will more selectively harden than in the 160° - 180°C range required by a less active catalyst.

THE KNOW-HOW OF HARDENING

Rapid hardening (say in 1½ hours) will result in less 'iso-acids' being formed than slow hardening with less active catalyst (which may require 6 hours).

The art of so hardening an oil to obtain the desired relationship between melting point and texture for any given degree of hardening, depends upon the know-how of ringing the changes between the activity and concentration of the catalyst, and temperature and time of hydrogenation.

The greatest range of characteristics is obtained by partially hardening oils with high proportions of unsaturated acids, e.g. cottonseed, groundnut, palm oil, etc.

Some of the principal fatty acids occurring in vegetable oils are tabled below:—

PRINCIPAL FATTY ACIDS

Fatty Acids	Melting Point of Triglyceride °C (or neutral oil)	Occurrence
SATURATED ACIDS		
Butyric	—	2–4% in milk fats. Traces in palm kernel and coconut oils.
Lauric	46.21	40–50% in palm kernel and coconut oils. 2–6% in milk fats.
Palmitic	65.5	6–8% in all vegetable fats. Main constituent of lard, tallow, palm oil, cocoa butter, etc.
MONO-UNSATURATED		
Lauroleic	—	Traces in butterfat, sperm and porpoise oils.
Palmitoleic	—	1% or less in olive, palm, cottonseed, peanut, soyabean oils. 2–3% in milk fats, lard, tallow.
Oleic	5.5	20% or more in all vegetable oils. Principal acid in olive, palm, peanut, sesame and sunflower seed oils, milk fats, lard, tallow and marine oils.
DI-UNSATURATED Linoleic	– 13.1	Soyabean, Safflower, linseed, perilla oils.
TRI-UNSATURATED Linolenic	– 24.2	

FOOD MANUFACTURE

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The unknown factor

"THIS is a remarkable chain of circumstance upon which those with a philosophical turn of mind may well wish to ponder," said Professor John Hawthorn at the Annual General Meeting of the Society of Chemical Industry in Glasgow. He was referring, in his lecture entitled "Food, Fall-out and the Isotopes of Strontium," to the fact that strontium seems to be a rather unpopular element in Nature; like a black-listed club member, it meets at every turn marked discrimination in favour of its more respectable relative calcium. More than half of our dietary calcium comes from milk, and most of the remainder from cereals. Somewhere in the cow's metabolic system there is a biological mechanism which is approximately seven times more favourable to calcium than to strontium, for its milk contains a calcium/strontium ratio very roughly seven times that of the pasture on which it feeds. Furthermore, if this milk is fed to a child, and if we assume that the source of all the child's bone calcium is milk, the ratio is approximately trebled. This means that a child's bones contain something like one-twentieth of the amount of strontium to be expected were there no biological filter.

Turning to cereals, we see an equally cheering picture. A cereal grain consists of the endosperm, comprised mainly of protein and starch and making up about 70% of the weight of the grain, the embryo, or germ, and the outer layers of bran enclosing the grain. Most of the germ and bran are removed during the commercial milling process, and it is in these parts in which strontium is concentrated, the endosperm containing very little. The results for both milk and cereals were obtained by tracer tests in which the tracer was applied to the roots; these artificial conditions do not necessarily simulate natural conditions of fall-out, but further work still in progress indicates that the natural pattern is not dissimilar. One infers that the higher the rate of extraction, the higher the strontium content.

Lest the conclusion hastily be reached that concern about the effects of fall-out from nuclear tests has been exaggerated, it must be emphasised that the question, "How much genetic damage is being done to the human race by nuclear tests on the present scale?" still has no positive answer. Experts may surmise, estimates may be made, but the fact remains that statements of how much radiation the human body may safely be exposed to are little more than arbitrary assessments made in the light of very imperfect knowledge. Our position may be compared to that of our grandfathers in the first days of motoring. So alarmed were they at the potential danger to life and limb that a man with a red flag had to walk ahead of every vehicle. Such an impracticable procedure was soon abandoned, but our grandfathers' fears were not baseless, for now six thousand people are killed every year on British roads. Put in a more vivid fashion, out of a cup-final crowd of 100,000, it is a safe bet that about ten will have died in road accidents, and 500 injured, by the next cup-final. Yet society shrugs its shoulders and says "it can't happen to me." Unfortunately, whereas escape from a road accident may possibly be ensured by emigration to an island where automobiles are not permitted, escape from nuclear fall-out is impossible. Furthermore, the ordinary citizen is powerless, it seems, to influence the tide of events. On the ethics and politics of nuclear weapons it is not within our scope to comment; what is within our scope is the potential effect of such weapons on human nutrition, and here at the present time we are up against a brick wall, for no one knows what it is.

Apples, vinegar, and toddy

WHAT is to be done with Europe's surplus apples? One suggestion, made by Mr. C. P. Norbury, member of the Fruit Committee of the National Farmers' Union, that some of the surplus should be used to make vinegar, provoked an immediate reaction—"You can't do that, the vinegar industry is traditional!"

Mr. Norbury was speaking at a recent meeting in London jointly attended by the S.C.I. Food Group and the National Farmers' Union at the invitation of the Commonwealth Fruits Council. Good quality apples are more plentiful than they used to be. Larger acreage of orchards, greater yields per acre, and greater discrimination among consumers have

lowered prices and increased the surplus of lower grade fruit which is becoming increasingly difficult to sell. Mr. Norbury's theme was that more apples should be used for processing, although, as another contributor to the discussion pointed out, if only one extra apple a week could be foisted on to each school child in the country, much of this country's surplus could be cleared off.

Why should not some of the apples be turned into vinegar? It would be interesting to know just how much this would affect the traditional vinegar manufacturing trade. It is true that malt vinegar of the established kind is a complex product of subtle flavour and aroma, and its manufacture is a traditional art. But not all the vinegar of commerce is of this kind, and there may be room in the food industry for apple vinegar. Vinegar can be made from most things that ferment, within reason, although of course the products are different in flavour and variable in quality. In Ceylon, vinegar is made from toddy, the fermented sap of the coconut palm. Coconut toddy vinegar when well made is reported to be of such excellence that "upon its merits it would readily find sale in the world's market." We have not ourselves sampled Ceylon vinegar, but one who lived there tells us he used it in preference to the imported stuff. The toddy vinegar industry started in about 1924, and in spite of being handicapped by the common Ceylonese habit of adulterating the vinegar with imported acetic acid, and by the suspicion that toddy tapping for vinegar manufacture has been a cloak for the illicit sale of fermented toddy, the trade has been a useful adjunct to the coconut industry and a good revenue earner.

Seeing red

How far do food manufacturers have to go to catch the customers' eyes? After several months of testing, a Midland baking firm have put into production a carnival bread in what has been described as a "startling range of colours." The excuse put forward for this colour mania is that housewives in Hollywood are able to buy bread to match the colour of their tablecloths.

The five colours being used are green, yellow, apricot, pink, and white, and worse is to come, for the firm are experimenting with, among others, banana- and strawberry-flavoured bread. A spokesman for the firm said that he thought that they were the only firm in the country making coloured bread.

Where will this sort of thing stop? Shall we buy canned peas and find that they have been coloured red? Shall we search for a Dover sole to discover that it has been tinted blue? We hope not, for we like our food well cooked and at the same time to be restful for the eyes.

Fish in Central Africa

SOME years ago we stood beside the Ripon Falls, where the River Nile flows out of Lake Victoria at Jinja in Uganda, and watched the fish leaping out of the river into the tumbling water of the falls, as salmon do in a Scottish stream. The fish seemed to enjoy the sport, for they returned again and again to fling themselves into the falling wall of water, to be carried into the maelstrom below. Now, alas, the falls, and the stone tablet beside them, which commemorated Speke's discovery of this source of the Nile in 1862, are submerged; a few miles downstream a dam has been built at Owen Falls, and where once the untamed river raced along its shallow course between the rocks where crocodiles basked in the sun, now the valley is partly filled by the sluggish lake water which surrenders its pent-up energy to the new hydro-electric plant.

We were reminded of the fish jumping into the Ripon Falls by a recent note from F.A.O. describing some experiments carried out by Dr. Rudolf Kreuzer, Chief of the Fish Processing Section of the Fisheries Division, on the artificial drying of fish in Central Africa. Sun drying, of course, is the traditional method of drying fish in the tropics, but this is largely dependent on the vagaries of weather and is very unsatisfactory during the rainy season. Dr. Kreuzer took with him to Africa a petrol motor and a fan, having arranged in advance with the Governments of the Central African territories which he visited to help him construct a simple drying tunnel. Carrying his gear on a lorry, he crossed wild country, traversing streams, getting stuck in swamps, and generally experiencing adventures which are the usual lot of pioneers. The first experiment, at a remote Nile fishing village in the Sudan, was a failure because of the high humidity; it was necessary to have the additional use of an oven to dry the air, but unfortunately in that area there were neither materials for constructing such an oven nor suitable fuel.

Dr. Kreuzer abandoned his experiments in the Sudan and went to Uganda, where he had a new drying tunnel and an oven constructed in a fish processing factory on the shores of Lake Edward. The experiment this time was very successful; the fish were dried very effectively in 24 to 36 hr. compared with the 10 to 14 days required by sun drying during the rainy season.

The first fish were too brown in colour; an oven of a different design and an electric instead of a petrol fan produced a batch of prime quality dried fish which won the approval of the Uganda fish merchants, and which was considered to be superior to most of the traditional sun-dried fish. An important result of the experiments is that the Uganda

Government have decided to establish artificial drying plants in the lake fisheries.

The potentialities of the fish supplies in Central Africa are as yet undeveloped, not so much from the point of view of the amount caught (this is already near the maximum obtainable without detriment to future catches) as from that of the subsequent processing.

The condition of a fish stall in a native market has to be seen to be believed; a dense cloud of flies almost obscures the fish. There is tremendous scope for improvement in processing and distribution, but, as Dr. Kreuzer has pointed out, rooted tribal habits, beliefs, and preferences have to be taken into account, and it would be a mistake to assume that modern methods and modern plants and equipment can be successfully introduced everywhere at once. The first need is to try and improve the traditional methods; later, modern fish technology can gradually be introduced.

No comment

IN London recently, an elderly lady was overheard to say to a younger one: "I believe that ——'s meat paste is all made at once and put into jars, and kipper, chicken, or anchovy labels put on. It all tastes exactly the same to me, whereas ——'s really tastes of what it says it is."

Standard for marzipan

EXACTLY a year ago (*Sept.*, 1958, p. 354) we commented on a request by the public health committee of the County Councils Association to the Minister of Agriculture, Fisheries, and Food, recommending a standard for marzipan and almond paste. The request followed a report by the Carmarthenshire County Council; in a later issue (*Nov.*, 1958, p. 471) we published a letter from the Association of Public Analysts drawing attention to certain points in the Carmarthenshire County Council's report with which the Association were not in agreement. The subject has cropped up again recently in a paper submitted to the conference of the Institute of Weights and Measures Administration by Mr. Stanley Dixon, public analyst for the city of Cardiff and the borough of Swansea, who says that marzipan used in the bakery trade for covering and as a layer in cakes is being debased by some manufacturers.

He states that to our grandmothers this term meant a product containing 40% or more of ground almonds. At the present time the commercial article generally contains from 25 to 30% of ground almonds, and 25% seems a reasonable limit for this constituent, but some recent samples, according to Mr. Dixon, have contained as little as 15%. Both marzipan and almond paste have recently been defined in Sweden. The former must contain at least 25% by weight of shelled white sweet almonds, while almond paste is a superior product and is required to contain at least 50% by weight.

There is, Mr. Dixon maintains, general agreement among public analysts that the abandonment of the Ministry's Labelling Advisory Service, the slackening in the making of food standards resulting from Government policy, and the cessation in the issue of codes of practice is creating a difficult situation.

The return of highly competitive selling has resulted in a marked trend towards the unsatisfactory conditions that existed before the Second World War.

Today some manufacturers are lowering the quality of products for which no standards exist, while others are making exaggerated claims and stating half-truths on their labels and in advertisements which are undoubtedly misleading to the public, though they may not deceive the expert. At the same time Courts are showing an increasing tendency to adopt the view that if the Minister with all his advisers is unable to decide on standards for foods, it is illogical to expect magistrates to make one. Lord Goddard, when Lord Chief Justice, frequently referred to the power of the Minister to make standards and to his failure to do so.

Mr. Dixon says that if we are not to revert to the unsatisfactory position that existed between the two wars it is essential that unofficial standards should be agreed with responsible trade organisations for a number of prepared and compounded foods for which there are no statutory standards.

He argues: "It appears to me that the policy of the Ministry of Agriculture, Fisheries, and Food at the present time is to make legal standards only in exceptional circumstances, and if the Ministry is now to dissociate itself from the codes of practice for which it was responsible, I consider that some other organisation must undertake such work in the interests of the purchaser.

"In this connection it must be remembered that it is the statutory duty of a public analyst to make standards for himself in cases where no standards exist.

"If we are to avoid the danger of different standards and levels of quality being set up in different localities, the first essential is to obtain uniformity in the views of public analysts. This can only be done through our professional association. Once this is achieved the next step is to seek agreement with the trade to enable manufacturers to know what will be accepted by public analysts as a reasonable level of quality."

The big thirst

WE had to look twice at the report of the West German correspondent of the *Manchester Guardian* which said that in West Germany the consumption of non-alcoholic drinks is increasing "at a formidable rate." Consumption has risen from about 16 pints per head before the war to about 45 pints, and at the same time about 15% more beer and 20% more wine are being drunk. Have the West Germans developed a gargantuan thirst?

There are said to be several reasons for this phenomenon. The first is that in the days of serious food shortage immediately after the war the population became vitamin-conscious, and as a result vitamin C drinks are said to be still increasing in popularity. The second is that more and more motorists are giving up alcoholic beverages since the police developed a habit of prosecuting motorists involved in an accident who had even a minute quantity of alcohol in their blood.

The third reason, and this really stretches the imagination, is that after the war the Allied authorities liberally impregnated the drinking water to prevent possible epidemics. No one, it appears, has done anything to amend this state of affairs, and the water tastes horrible.

Progress in packaging

IT has been estimated that about 12% of the cost of manufactured goods in Britain goes on packaging, while the amount of floor space and labour devoted to the subject by the manufacturer is very much more than this. Half the paper production of the country is used by the packaging industry; such statistics could be multiplied, but unnecessarily, for the importance of the industry does not need emphasising. If one were to say that British industry spends annually something like £400 million for wrapping up its products, such a figure would only be a shrewd guess, for no one really knows the exact amount; but that was the figure generally accepted three years ago, and today it certainly is not less.

Although the sophisticated packs of today may seem far removed from the austere days of the war, to those days belong the origins of modern packaging technology. Before the war, packaging was an empirical affair to which little serious study was given, except by a handful of enlightened manufacturers. When war came, and supplies had to be sent in hazardous circumstances to corrosive climates, it was found that many goods did not stand up to the rigorous transport and storage conditions; food was ruined by mould and vermin, and lessons in packaging were learned the hard way. The knowledge so obtained was put to good use after the war when restrictions on the use of materials were relaxed and new materials were developed.

In the exhibition being held at Olympia this month, the latest in materials, machines, and methods is on view. So many are the materials used in package manufacture, so varied the fields in which packaging plays a part, so diverse the goods packaged, that packaging means different things to different observers. The requirements of a manufacturer who wants to wrap boiled sweets are not the same as those of one who wants to send a piece of delicate machinery to Siam, nor yet the same as one who wishes to stopper bottles of squash, yet all these are packaging problems. Small wonder that this year's exhibition is as diverse and varied as any could be.

Crustiness about bread

"BREAD so bad, local housewives must re-cook it" was the headline which stared at us from the pages of the South Wales *Voice*. "Is there anything wrong with Swansea bread?" asked the newspaper. It seems there is, judging by the comments of some of the citizens. The trouble began when a baker was summoned for selling underweight bread; a solicitor in court made the challenging statement that much of Swansea's bread is so bad that it must be recooked to make it crusty. "Goodness gracious!" was the general reaction of the bakers, but many housewives were more specific. "The centre of the loaf is full of dough," said one. "Really hopeless," said another angrily. A third saw the sinister nigger of big business in the woodpile of bakerdom: "In my opinion these big firms like to get too many loaves out of one sack of flour."

There seems to be a lot of disagreement as to what is a good loaf of bread. The bakeries say that they supply what the public wants, the public in turn complain in varying degrees that bread today is not what it used to be. There is no doubt that the extension of the big plant bakeries' share of the market has resulted in a greater standardisation of the kind of bread available. Bread is not so crusty as it was, and some people like an honest-to-goodness crust, even to the extent of being a little burnt. "I think it would be a pity," said the Minister of Food recently, "if we lost the wide range of various types of loaf which used to be available. And so I hope you will be able to maintain variety, as well as excellence, in your product."

An apology

ONCE again we ask the indulgence of our readers and advertisers for our late appearance. The printing dispute is now past history, but the arrears accumulated during the six weeks of standstill will take some time to work off. We shall be back to normal as soon as possible.

(*Left*): A load of peas being fed to the viners at Aylesford. (*Below*): Peas discharging from rotary washers after being vined and winnowed.

How Kent's Garden Produce is Canned

Swift handling in Foster Clark's extended cannery

When FOOD MANUFACTURE recently visited Foster Clark's cannery at Maidstone, garden peas were being processed at the rate of 70 tons per day, as well as cherries and soft fruit. The result of careful planning is year-round operation, while in another plant, also described in this exclusive article, production of packet lines continues steadily.

THE story of Foster Clark, Ltd., might almost be epitomised by the hackneyed expression "local boy makes good," except that the founder, the late Mr. George Foster Clark, was not born in Maidstone, although he lived there for most of his life. He showed signs of his future career at an early age, for in about 1875, while still at school, he made lemonade powder and sold it to his school friends. On leaving school he started work in a grocer's shop, and continued his experiments making baking powder and bun flour in his mother's kitchen. These products were sold, by arrangement with his employer, in the shop, and the success of his efforts prompted him, in 1889, at the age of 26, to set up in business on his own account on a capital of £44. Thus was launched the business known as George Foster Clark and Co., which later became Foster Clark, Ltd. Its first products were baking powder and bun flour, followed by lemonade powder and jellies. At this time the building of the Eiffel Tower was capturing wide interest, and with an eye to publicity, George Foster Clark registered *Eiffel Tower* as his brand name, which is retained to this day for the company's soft drink powders and crystals. Well known as they are for a wide range of packet goods, it is in the field of canning that Foster Clark's are now pre-eminent, and their Maidstone cannery, greatly enlarged and completely re-equipped over the last six years at a cost of something like £½ million, is now one of the most modern in the country.

When George Foster Clark's original shed in Mote Road became inadequate, he bought part of a jam factory in Hart Street in 1895. The factory has grown and extended on this site ever since. Shortly afterwards, land in adjoining Barker Road was bought and a printing works built to handle all the company's printing, box making, and the manufacture

(*Left*): **On emerging from the blancher in the background, peas pass along inspection belts and any sub-standard peas are removed.**
(*Right*): **A machine for filling cans of peas.**

of tins and canisters. The attractively lithographed cans are now supplied by the Metal Box Company, Ltd., printed cartons, outers, and canisters being obtained from several specialist sources.

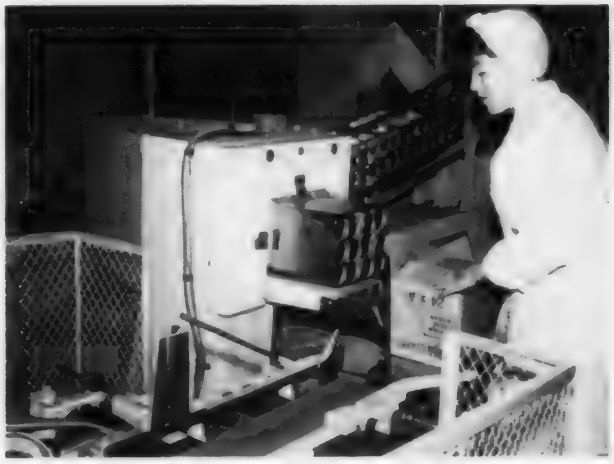
A major step forward took place in 1910, when the business was registered as a private company, powdered soup was added to the range of products and a canning plant was built. An Australian subsidiary company was founded in 1918, which today is one of the most important of its kind in that country. The business became a public company in 1928. During the past six years the Hart Street factory has been entirely reorganised, a new canning section covering over 50,000 sq. ft. has been built, and all manufacture of packet lines has been transferred to the Barker Road site. The Hart Street factory is now entirely devoted to canning, and the arrangement of the plant in the two-storey building, whereby empty cans and cases are housed in the top section from which they are carried fully automatically through the cannery to return to the casing, packing, and despatch departments on the ground floor, makes for maximum efficiency and the minimum of manual handling.

High pressure at harvest time

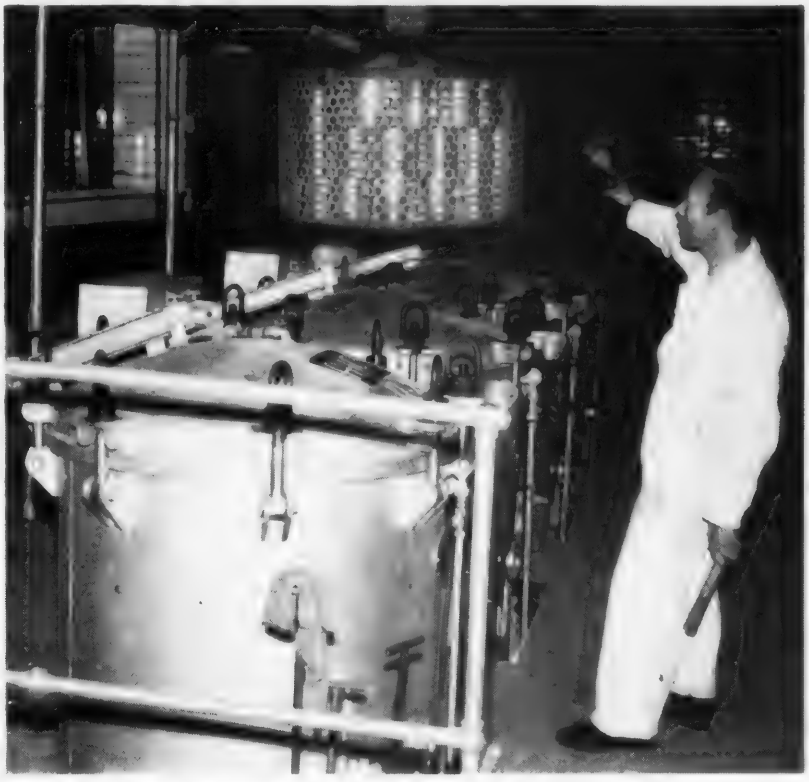
The sources of the company's products lie in the rich countryside surrounding Maidstone. Vegetables, such as peas, runner beans, and carrots, and soft fruits—cherries, strawberries, plums, blackcurrants, raspberries, gooseberries, and blackberries—are canned in large quantities within a few hours of harvesting. Harvest time makes heavy demands on the company's staff, for in the space of the few weeks during which each crop is in season, sufficient has to be canned to meet a growing year-round demand. Production plans have to be made far in advance, yet must be flexible enough to cope with the uncertainties which are part and parcel of agriculture. As an instance of the difficulties which occur, when our visit was made an unusually long period of fine dry weather had brought on the pea crop quicker than usual, so that instead of being spaced over about six weeks, it was compressed into something like three. The increased pressure on the production staff does not need elaborating.

On arrival at Maidstone, the peas are emptied into a hopper and pumped with this pea pump to the grading machines.

Another difficulty inherent in the processing of seasonal foods is that special plant to deal with one line of product lies idle for most of the year. Not so long ago, when fewer lines were being canned, the whole cannery was a victim of this fluctuation, but by careful planning Foster Clark's cannery is now able to operate all the year round. In the winter season, canning of carrots, processed peas and beans in tomato sauce, and spaghetti in tomato sauce, is carried on. Flexibility of plant design enables much of the same machinery to be used for different lines. For example, the pea vining machines



(Left): **Filling cherries into cans. The empty cans pass along a conveyor beneath a slotted table; the cherries on the table are guided by hand through the slot into the cans.** *(Right):* **A case packing machine, which puts 12 size A1 cans into a carton at a time.**



Some of the retorts in which filled cans are heated under pressure.

are able to deal with the broad bean crop when the pea season has finished.

Canning of peas

At the time of our visit, pea canning was in full swing, and we saw the site at Aylesford, about 3 miles from the Maidstone factory, where the company's six pea viners were working. In addition the company operate a number of semi-mobile viners in the field. The peas are grown under contract by farmers in the district, who undertake to supply to the company a specified acreage of peas. The responsibility for deciding when the peas are to be harvested rests with the company's fieldsmen, whose judgment of the ripeness of the peas is assisted with an instrument known as a tenderometer. This measures the force needed to crush peas under standard conditions. For each variety of garden pea there is a certain practical canning stage, or P.C.S. as it is known, when the peas are at their best for canning. Within reason, the more tender the pea the more suitable it is for canning, but the sooner peas are picked the lower the yield. For extra-tender and young peas the farmer is accordingly paid more, and the arrangement, we were told, works very amicably.

The pea vines are delivered by lorry from the farms to the vining station. Although the crop has already been tested by the fieldsmen, additional samples are taken before vining, tested with the tenderometer, and records kept of each consignment. These records go to the cannery for evaluation by the quality control department. The labour force at Aylesford is augmented during the season by students on vacation, who fork the vines on to the conveyors which feed the viners. The viners separate the peas from the vines and the pods; the discarded material passes by high-speed conveyor to waiting lorries outside, which take it back to the farms for use as cattle feed or for ploughing into the soil. The peas pass to winnowing machines which separate residual pieces of vine and im-

(*Left*): **Measuring the tenderness of peas with a tenderometer.** (*Right*): **Cherries being sampled in the quality control laboratory.**

mature peas, then travel along riffle flumes to washing machines which remove the final traces of dirt and other unwanted matter. The riffle flumes are stepped channels along which the peas are carried in a flow of water; stones and grit are retained on the steps. After a final wash in fresh water, the peas are collected in aluminium trays for removal by lorry to the cannery.

On arrival at the cannery they are received in hoppers and pumped in a flow of water by means of a pea pump through glass piping to one of two rotary screen graders. Having been graded, the peas are conveyed in water flumes first to storage tanks and then to the blanchers. After blanching, they are washed again and discharged on to inspection belts, where they are visually inspected. Here blemished peas are removed, and the peas are given a final spray wash before they pass to automatic filling machines for filling into the cans which have in the meantime been placed on the conveyors on the floor above and washed and sterilised. The filled cans are topped up with sweetened and coloured brine, which has previously been prepared in the syrup room on the floor above, and then pass through the clinchers and exhausters before being finally seamed.

Most of the output of canned peas is cooked in two automatic steam pressure cookers, but to handle additional processing over and above that which can be dealt with by the cookers, there are 24 retorts in two retort rooms. Cans are conveyed to the retort rooms in steel baskets suspended from an overhead runway.

There are three pea canning lines, with a capacity of about 70 tons of peas per day. The fastest of the three has a capacity of about 200 A1 cans per min.

Cherries and strawberries

Typical of the canning process for fruit is the canning of Kentish cherries, a speciality of the company for which demand grows year by year. To take care of heavy deliveries at the height of the season, when fruit may be delivered faster than it can be handled, there are two cold stores which are also used for other soft fruits such as blackcurrant and strawberries when necessary. Most of the fruit, however, is processed directly on arrival, and passes straight to the hoppers of the stem removing and washing machines. In these machines the fruit passes over rapidly rotating horizontal rollers; as the cherries are spread out over the rollers by the hands of the women operatives, the stems are nipped between the rollers and pulled off, while the stemmed cherries pass under a series of spray washers. The fruit, after inspection on sorting tables where damaged fruit is removed, then passes by means of conveyors to two vibratory graders, Dutch machines which were originally designed for grading bulbs but which have been found to be very satisfactory and economical for this purpose. The graded cherries are transferred to filling tables, which are mounted directly over runways along which are delivered washed and sterilised cans ready for filling. The cans pass directly underneath slots in the filling tables, and as the cherries are emptied on to the tables, women move them towards the slots, through which they drop into the cans. The flow of fruit is maintained so that each can as it leaves the filling table is filled with the correct weight of fruit. A proportion of the cans are then checkweighed, excess fruit being collected on trays beneath the conveyor. The cans are then automatically topped up with syrup and pass to a lidding and sealing machine, then to a steam cooker before finally being cooled. There are five lines for dealing with cherries, and 60 tons a day can be handled.

Strawberries pass first along an inspection belt where they are examined by women who discard faulty fruit and remove any stems and calyxes left behind by the

The packet goods department. (*Left*): **Cut jelly portions being automatically wrapped and cartoned after being checkweighed.** (*Right*): **Filling and packing cans of custard powder.**

pickers, and then through a washer which sprays the fruit from above and below. The fruit is then graded by hand into three sizes before being conveyed to the canning tables for filling into cans. During our visit, a consignment of loganberries was being experimentally dealt with by this plant; not normally regarded as one of the popular lines, this product nevertheless is being developed.

Syrup and brine used in the canning of vegetables and soft fruit are manufactured in a syrup room containing a number of 120 gal. stainless steel tanks fitted with heating coils and stirrers. Sugar delivery is by Tate and Lyle tanker lorries in the form of syrup, which is pumped directly from the tanker into storage tanks. Syrup and brine pass through glass pipes to storage tanks on each canning line, where thermostatically controlled heating coils maintain correct temperatures.

Pallets not needed

Cans are delivered on pallets in large articulated lorries in the cartons in which they will finally be despatched. The cans are lifted directly on to the receiving bay on the first floor by fork lift trucks. Trucks fitted with clamps then remove each load from its pallet, which is returned immediately to the lorry. These clamp-fitted trucks are used throughout the factory, and obviate the need for pallets, each load being gripped by the side plates. Their universal use throughout the factory has resulted in a saving of something like £20,000 capital outlay.

The cartons are emptied by hand, the cans being placed on conveyors which take them to the can washing and sterilising machines on the floor below. The cartons are dropped down a chute and pass to the packing department to be used for packing the cannery's products.

A section of the despatch warehouse, showing one of the clamp trucks which obviate the need for pallets.

Counting and packing

From the canning lines the filled cans pass on conveyors through counting devices which automatically record the output of each product. All lines converge on a central point before entering the casing and despatch department. Case packing machines are used to pack the tinned goods into the cartons, which after being sealed pass to the warehousing section to await despatch. Here again no pallets are used, all movement of stock being carried out by the electric clamp trucks which have a 14 ft. lift and which can stack with a gap between stacks of only the width of a clamp plate.

Quality control

In the quality control laboratory the chief chemist and his assistants constantly check the production of all canned goods; in addition to the testing of routine samples of raw materials and packed goods, spot checks are frequently carried out at all points on the production lines to ensure maximum quality.

Packet goods factory

All the company's packet lines, such as soups, custard powder, jellies, and powdered drinks, are now made in the Barker Road factory. Normally when canning is at its height, the production of packet lines is at its minimum, a policy designed to even out as much as possible overall production and to reduce the strain on the staff.

The factory has two floors, and materials in process travel from the top down by gravity. On the top floor are compounded the soup mixes, custard powders, and powdered drinks, which pass through chutes to the filling and packing machines on the floor below. On the top floor also is the control laboratory and experimental department where quality is controlled and new products developed. The jelly-making department is glass walled and air conditioned; a dehumidifying plant keeps the moisture down to a low level. In the manufacture of jelly, the flavouring and colouring ingredients are blended in horizontal mixers and fed to a stainless steel steam-jacketed mixing pan, where the soaked gelatine is added. The jelly syrup gravitates through stainless steel strainers, fitted with nylon filters, to refrigerated nickel-plated cooling tables where it is poured into moulds and allowed to set. After press cutting, the jellies are check-weighed, cellophane-wrapped and cartoned automatically.

Suppliers of equipment

Fredk. Braby and Co., Ltd.: exhauster, blancher, and soaking tanks.

Wm. Brierley, Collier and Hartley, Ltd.: snibbers.

Cochran and Co., Ltd.: boilers.

Conveyancer Fork Trucks, Ltd.: clamp trucks.

Food Machinery Corporation: tenderometers, carrot steamer and washer.

John Fraser and Son, Ltd.: retorts.

J. A. Jobling and Co., Ltd.: glass piping.

A. Johnson and Co., Ltd.: stainless steel syrup and brine tanks.

Mather and Platt, Ltd.: viners, winnowers, flotation washers, elevators, pressure cookers, pea fillers, graders, exhausters, blanchers, spinach washers, and *Standard-Knapp* case packers and gluers.

The Metal Box Co., Ltd.: cable conveyors, preparation belts, can washers, syrupers, seamers and clinchers.

Pulsometer Engineering Co., Ltd.: water pumps.

Purdy Machinery Co., Ltd.: labelling machines.

Ransomes, Sims and Jefferies, Ltd.: fork lift trucks.

The Great American Stomach Ache

As breakfast eaters spoon their corn flakes and shredded wheat, how many, we wonder, realise the bizarre beginnings of the enormous breakfast cereal industry? The story told by Gerald Carson* of the growth of this modern phenomenon is truly a weird one, bound up as it is with Bible-thumping vegetarians, self-appointed prophets and visionaries and women's dress reformers, not to mention the Kelloggs, "The Doctor" (John Harvey) and his brother, W. K. Beginning as a reaction against the gross eating habits of the American pioneers, which in the great out-doors no doubt were picturesque but which when carried over into sedentary city life produced indigestion as a national disease, the consumption of vegetarian "health foods" was enthusiastically taken up by a group of Adventist food cranks whose headquarters were the Michigan town of Battle Creek. Vegetarianism as a philosophy was widespread, but it was the genius of Dr. J. H. Kellogg, founder of the Battle Creek Sanitarium, which organised the movement. The association of the talented surgeon with the cranky visionary, Sister White, who unfailingly transmitted heavenly messages and directions, is a strange tale, and Dr. Kellogg later played down the Adventist doctrines when his affairs were running sufficiently well under their own steam not to require the direct moral and financial support of the Adventist cause.

Important as Dr. Kellogg was in the cornflake story, the honour of originating the first commercial breakfast cereal goes to Henry Perky, who devised shredded wheat. Kellogg's refusal to buy Perky's idea was a major commercial mistake which caused the Doctor an agony of remorse for the rest of his life, but "cornflakes" were the outcome of his frenzied efforts to produce a competitive product. The story of how the Doctor and his wife endlessly rolled wheat grains with a rolling pin, picking off the flattened granules which obstinately refused to "unstick," is an entertaining one, yet their perseverence was rewarded by the discovery, through the accidental use of mouldy wheat, that moisture content is a dominant factor.

On to the scene came C. W. Post, originally a patient of Kellogg, who quickly gleaned some useful ideas which he put to good account, making a fortune out of his Grape Nuts and Post Toasties. But it was W. K. Kellogg, younger brother of the Doctor, who eventually launched cornflakes and their kindred products on to the world market and built the Kellogg company and the philanthropic Foundation.

The author tells his story with relish, and describes the ballyhoo with amused detachment. Accompanying the text are illustrations as varied and startling as the story itself.—A. W.

* *Cornflake Crusade*. By Gerald Carson. Victor Gollancz, London, 1959. Pp. 259. 21s. net.

PACKAGING on DISPLAY

HIGHLIGHTS of the EXHIBITION

Olympia, from September 8 to 18, is the scene of this year's Packaging Exhibition, where new packaging methods and the improvement of existing ones are on show. Some £400 million is paid annually by U.K. industry for packaging, a striking indication of its importance in ensuring product protection and sales appeal.

Machines

Albro Fillers and Engineering, Ltd.
(Stand No. 5H, ground floor, National Hall.)

A comprehensive range of this firm's filling and capping machines is on view; a new model is the Albro type T.C. volumetric filler for containers up to one gallon, which works on a time control principle. It is claimed to deposit accurate quantities irrespective of the weight, shape, or size of the container, and can therefore handle plastic bags. Other machines on show are a 15-head fully automatic filler for French mustard, a 15-head dustless powder filling machine, fully and semi-automatic capping and lidding machines and machines for applying stopper corks into bottles.

Alite Machines, Ltd.
(Stand No. 21, outer row, first floor, National Hall.)

Machines on view include a fully automatic tube filling machine type GAB, a bag filling machine type VUF, and a semi-automatic utility packer for flour and other products in gusset-type bags, all these machines being new. Also on show is a comprehensive range of powder handling equipment, including a fully automatic filling and lidding machine with an output of 50-100 containers a minute, continuous metering, mixing and elevating machines, and the *Kisab* strip packing and heat sealing machines for tablets, powders, and liquids.

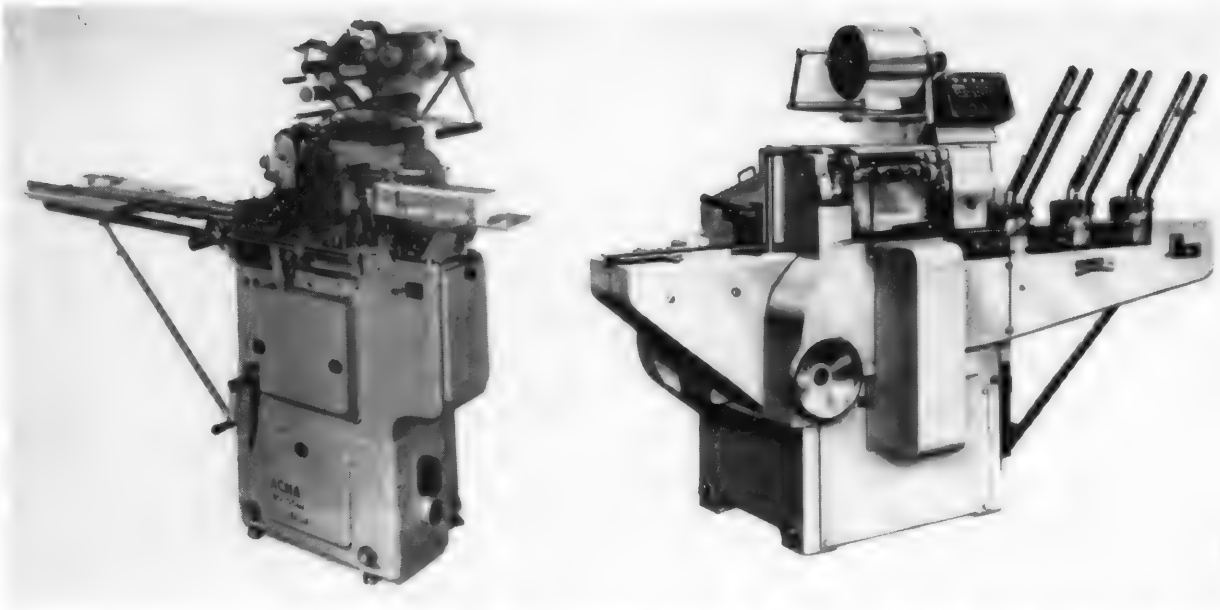
Auto Wrappers (Norwich), Ltd.
(Stand No. 3M, ground floor, National Hall.)

Two new automatic wrapping machines developed within the last year are being shown on this stand. They are the type RH high-speed roll wrapper, on show for the first time, and the type RB small pack wrapping machine for round biscuits. The former is basically a faster version of the company's type R roll wrapper for round sweets, chocolates, etc., and the speed of wrapping has been increased to 120 a minute. The standard machine wraps one size from 2¼ in. long by ½ in. diameter to 4½ in. long by 15/16 in. diameter; larger or smaller packs can be accommodated by a special rolling head. The RB machine has an output of 60 packs a minute, ranging from a minimum diameter of 1½ in. to a maximum of 2½ in. and heights of from 1 in. to 3 in.

(*Above*): The "Cima" type ZV high-speed butter margarine moulding and wrapping machine, made by Kustner Bros. and Co., Ltd., has an output of 120 bricks per min.

Azionaria Costruzioni Macchine Automatiche
(Stand No. 9B, ground floor, Grand Hall.)

On this stand are exhibited the model 771 high-speed cellulose film wrapping machine capable of 100 to 140 wraps per minute; the model 762 automatic portion packaging machine making up bags or sachets from the single reel of heat sealing or glue sealing materials; the model 752 automatic unit for carton erecting, filling, checking,



Wrapping machines. (*Left*): **The ACMA Model 771 film wrapping machine does 100 to 140 wraps a minute.** (*Right*): **The Auto Wrappers type RB small wrapping machine for round biscuits.**

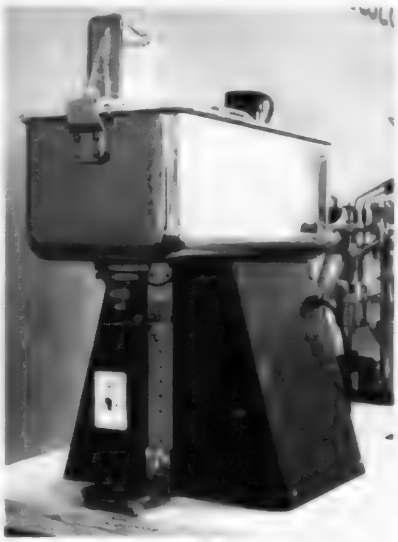
closing, and collating, suitable for free-flowing granular products; the Hayssen automatic carton overwrapping machine to wrap from the reel in glue or heat sealing materials, with electric eye registration for printed sections; the Ciliotta semi-automatic labelling machines to apply up to three labels simultaneously on bottles and containers of various shapes and sizes; and the Ciliotta semi-automatic bottle capping machines to apply metal closures to bottles, using a plain metal cap which is spun to the contour of the bottle top by centrifugal force.

Baker Perkins, Ltd.

(Stand No. 1G, ground floor, National Hall.)

This firm is exhibiting in conjunction with the Forgrove Machinery Co., Ltd., and is showing some entirely new machines, among which is the Forgrove 87 high-speed bunch wrapper for suitable round tablets. The wrapping material feed is continuous, the cut-off being by rotary knife, and the tablets themselves are automatically fed vertically from a small hopper into individual pockets in a continuously rotating feed wheel. The mechanism is entirely rotary with the exception of the transfer and ejector movements. Most of the cams and gears are totally enclosed and are lubricated by a pump from a central sump. Provided that the sweets to be wrapped are pre-graded, the possible output is 550 bunch-wrapped sweets a minute.

Also on show are the Forgrove 84 and 84B *Flowpak* continuous action wrapping machines which feed the articles to be wrapped into a tube of wrapping material; the Forgrove 42C/750 plastic caramel cutting and twist wrapping machine, which runs at speeds of up to 750 formed and twist-wrapped pieces of caramel, toffee, or high-boiled sugar per min.; the high-speed DF1 bar wrapping machine, which is shown in action feeding a model 88 carton loading and closing machine, the cartons themselves being formed on a TLB carton forming machine; the LFA carton wrapping machine is shown wrapping cartons and trays in polythene; and for the biscuit industry, the Forgrove 4D biscuit wrapping machine is being shown.



The Albro T.C. volumetric filling machine for filling liquids into containers of all shapes and sizes up to 1 gal.

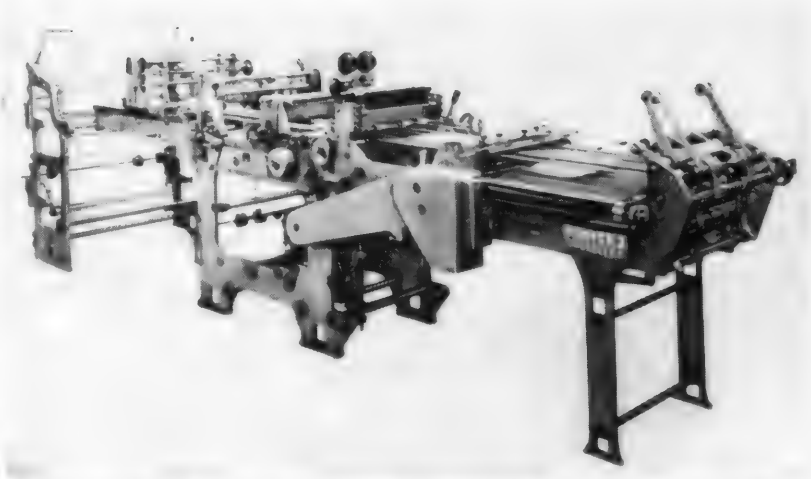
This firm's American associates, Package Machinery Co., are exhibiting a model CM3 high-speed small carton wrapper, while the CMV5 constant motion vertical cartoning machine, the British-built version of the machine made by R. A. Jones and Co., Inc., of Cincinnati, is also on the stand.

Bramigk and Co., Ltd.

(Stand No. 11H, ground floor, National Hall.)

On view at this stand are the Hansella 30A candy wrapper for the individual wrapping of boiled sweets; the Transwrap machine type 125C for packaging twist-

wrapped sweets in unsupported polythene; the Transwrap 200A for the packaging of coffee beans and powders in *metathene*; the Printex 380B bag-making machine for making polythene bags from gusseted or flat tubing; and the Vol-Pak machine for producing fin-seal packs, one of which is shown packing sugar.



The Printex type 380B for the automatic production of flat or gusset type polythene bags.

Leon Davis and Co., Ltd.

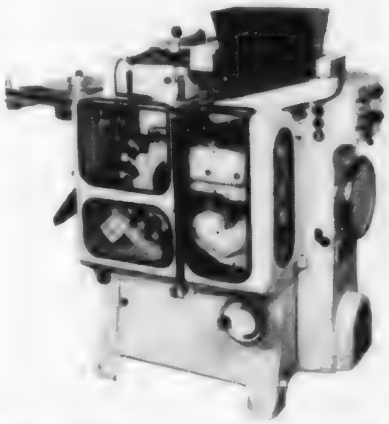
(Stand No. 11, inner row, first floor, Grand Hall.)

This firm are showing a wide range of *Oyster* brand gummed paper tapes, tape dispensing machines, and label gumming machines. Among the last named, the *Oyster Imp* nos. 1, 2, and 3 automatic feed machines are shown, the No. 1 being hand-operated, the No. 2 electrically operated, and the No. 3 electrically operated with in addition an infinitely variable speed arrangement. The newest additions to this firm's range of machines are the *Oyster Hade* Nos. 1 to 5, all of which are double purpose machines which can be used with gum or water.

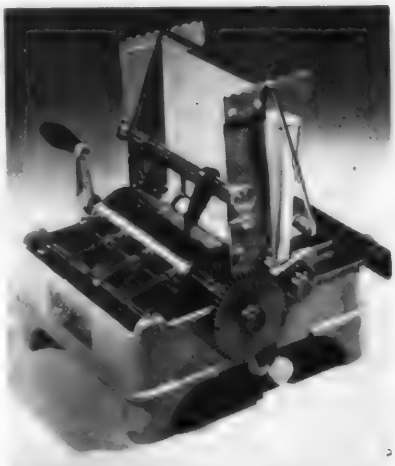
Charles E. Douglas and Co., Ltd.

(Stand No. 4J, ground floor, National Hall.)

This firm is showing a wide range of packaging, bag making, sealing and wrapping machines, among which the FMC high-speed non-shock case packer is a new machine now being used in this country after a number of years' use in the U.S.A. In this machine the cans travel upright, reducing the possibility of damage, especially to the seams. The machine is capable of outputs of up to 20 cases per minute. Other machines on view are the Simplex model 200 bag making machine for bags up to 40 in. wide, the Simplex model 7/24 pouch making machine, the Elliott short case sealer made by Varley-FMC, Ltd., the Sure-Way package caser made by the International Machinery Corporation, the Campbell wrapper, the Accordian gravity conveyor, and a number of Douglas wrapping machines —the carton wrapper S.E.M., the pleat wrapper p.8, the crease wrapper C.W.58, the sleeve wrapper model S.W.4, and the automatic crease wrapper.



The Forgrove 87 high-speed bunch wrapping machine has an output of up to 550 sweets per min.



The Oyster Imp No. 1 label gumming machine.

Flexile Metal Co., Ltd.

(Stand No. 19D, ground floor, Grand Hall.)

On this stand is being demonstrated the Perry *Accofil* lab gun for powder filling and the *Flexicloser*, a semi-automatic machine for folding tubes. Also being demonstrated is a prototype machine for printing tubes in four colours, and the Kalix Dupuy auto-filling machine with jar feeding turntable.

Gerrard Industries, Ltd.

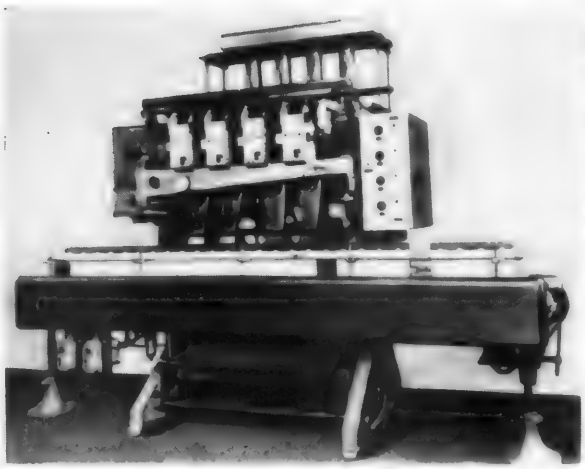
(Stand No. 2C, ground floor, Grand Hall.)

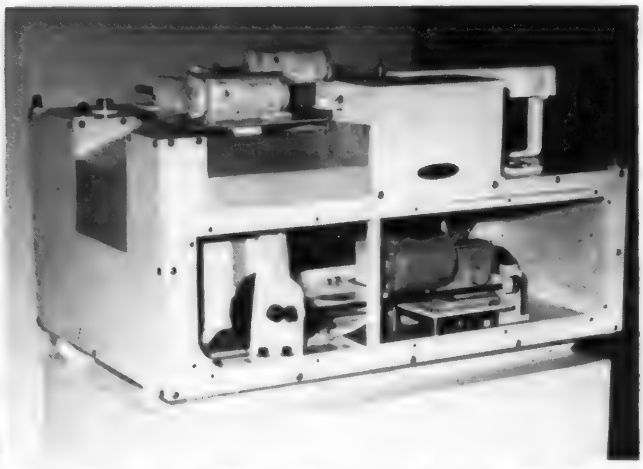
Two entirely new tensional steel strapping machines are being shown, the automatic coil wire tying machine for binding and securing coils of wire of varying weights and sizes, and the Seal-less machine with pneumatic tension, which is claimed to give maximum tension of the strapping without effort, the tension being predetermined.

Goring Kerr, Ltd.

(Stand No. 7B, ground floor, Grand Hall.)

The mk. 7 range of metal detectors is shown, including a unit fitted to a reversing conveyor. Materials fed into a hopper are passed through the metal detector





Checkweighers. (*Left*): **The 4-head " Pneumatron " nett weighing machine made by Rockwell Pneumatic Scale Co., Ltd., has an air control device for detecting the deflection of a cantilever assembly.** (*Right*): **The Hy-Tra-Lec " Crossbow " checkweigher segregates and counts overweights, underweights and correct weights, and handles up to 60 packages per min.**

search head; if metal is present, the belt will stop and reverse to a pre-determined position where the product can be examined. Also being shown is the mk. 2 range of proximity detection instruments, consisting of control units and a wide variety of probes, for controlling and indicating the levels of all materials and for operating counting devices for packets, sacks, etc.

John Gosheron and Co., Ltd.
(Stand No. 4L, ground floor, National Hall.)

On this stand are being demonstrated the firm's full range of dispensers, together with one of their three new carton taping machines, as well as an automatic tin sealing unit, a hand carton sealer, a shallow " U " sealer, and a four colour tape printing machine. In addition the firm are showing their latest under-surface printed tapes and the full range of film, cloth and paper self-adhesive tapes, and labels. Tin, carton and bag sealing, advertising, pricing, coding, and labelling applications are being displayed.

Industrial Products (Speco), Ltd.
(Stand No. 24, inner row, first floor, Grand Hall.)

Among the standard *Hy-Tra-Lec* check-weighers on display is the *Streamline* model 1 for check-weighing rectangular or round packs from 1 to 32 oz. at up to 60 per min., which segregates them into correct, underweight and overweight channels in a straight-through flow line. Counting facilities are also available. The *Streamline* model 2 is similar, but is designed to handle wider packs. Also being shown is the *Crossbow* model 3 for check-weighing round or rectangular packs up to 7 in. by 9¾ in. at speeds from 45 to 60 per min., which gives a right-angled direction of flow for the correct, overweight, or underweight output channels. Facilities are also available on this machine for counting underweights, overweights, and the total number of packs passing through the machine.

Industrial Tapes, Ltd.
(Stand No. 5D, ground floor, Grand Hall.)

This firm are showing three machines from their range; an automatic bag closing machine for film and paper bags, which handles packs up to 10 lb. in weight and which provides a double tape flag closure round the gathered neck of the filled bag; a pad applicator for labelling, identifying, sealing, holding, splicing, and bundling at up to 300 per min.; and a machine for sealing slip lids round tins of diameters from 3 in. to 8 in. The wide range of *Speedfix* self-adhesive materials claimed to cover all aspects of packaging, labelling, sealing, marking, and protection are also on view.

Kustner Brothers and Co., Ltd.
(Stand No. 9A, ground floor, Grand Hall.)

On display at this stand is the *Cima* type ZV high-speed butter or margarine moulding and wrapping machine. Butter placed in the hopper is forced into a dosing device by means of two stuffing worms. The moulded butter comes out in a continuous ribbon through an extruding mouth and having the exact dimensions of the pat of butter. It is cut to size by a cutting wire, pushed vertically under the sheet of wrapping material, and wrapped on three sides with simultaneous marking of the first fold. Several other operations complete the wrapping. Output is 120 bricks per min.

Manesty Machines, Ltd.
(Stand No. 13E, ground floor, Grand Hall.)

Machines not exhibited previously which will be on show this year include the *Rotapress*, a high-speed rotary tablet machine capable of producing 6,000 tablets per min. A number of new features are incorporated in this new model, and these include an entirely new type of rotary feed which is claimed to allow almost dustless operation of the machine. It also incorporates internal helical

gearing, again allowing improved lubrication and freedom from powder entry. A new form of pressure loading and overload release has been devised.

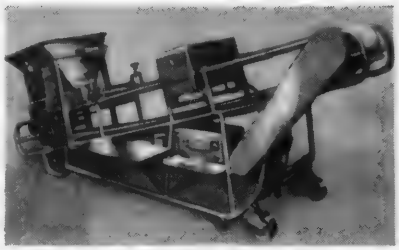
The firm's *DryCota* combined tablet making and compression coating machine is also being shown with the *CenterCota*. Another new model being shown for the first time is the Manesty 300 stainless steel mixer.

Mardon, Son and Hall, Ltd.
(Stand No. 3D, ground floor, Grand Hall.)

The *Cluster-Pak* machine-erected can sleeve, used in the U.S.A., is now being sold under licence in this country and is on show at this stand, together with the automatic *Midget Cluster-Pak* machine, which is being made for this firm by the Lerner Machine Co. Capable of a speed of 25 sleeves a minute, the machine takes from 2 to 6 cans in single file and from 4 to 12 cans in double file. The sleeve itself does not depend on glue or staples to hold it together. Special locking tabs pushed home at the base of the sleeve are claimed to give a tight and efficient pack, and to ensure that the pack remains secure during handling from manufacturer to consumer. The firm also offer a very simple hand jig for erecting sleeves of two or three cans at 8 to 10 sleeves a min., and at the other end of the scale, there is the *Cluster-Pak* Standard-CU machine capable of 100 sleeves per min.

The Metal Box Co., Ltd.
(Stand No. 12D, ground floor, Grand Hall.)

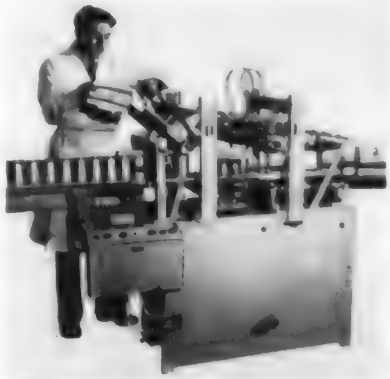
The Machinery Building Group is showing five machines: the MB differential double seamer for can-seaming; designed on a new principle to run at very high speeds; the MB empty can unscrambler for feeding cans from cartons or cages to a filling line so that they arrive the right way up; the *Jak-et-Pak* 50 for packing cans and composites in multiples of 2 to 8 units in cardboard sleeves; the *Diotite* closing and sealing machine for a new system of packaging frozen food; and the MB unit filler and capper, for filling and closing polythene pots for jams and syrups. All these machines are shown working.



The Goring Kerr Mk. 7 metal detector, which stops a conveyor belt and reverses it to a predetermined position if metal is found in a product.

Nealis Harrison, Ltd.
(Stand No. 7D, ground floor, Grand Hall.)

Included in this firm's exhibits are two new units, a gravity filler specially designed for filling frothy liquids, and a new type of channel belt conveyor which has collapsible sides on the main belt and which is designed for conveying loose materials normally conveyed by a trough belt. Other examples from this firm's range of vacuum operated filling machines on view are: the *Harrison-Rapid* 4-head semi-automatic vacuum filler; the *Twin-Rapid* 2-head vacuum filler; the *Single-Rapid* single-head vacuum filler; the *Senior* twin-head vacuum filler; and the *Junior* single-head vacuum filler. The last is a bench machine, all the others being portable cabinet models.



The automatic Midget "Cluster-Pak" can sleeving machine made by the Lerner Machine Co. for Mardon, Son and Hall, Ltd.

Nuvec Products, Ltd.
(Stand No. 35, outer row, first floor, Grand Hall.)

The machine being exhibited is the Mark III vacuum sealing machine, which is equipped with a tray loading system and an automatic ejection device. Four bags up to 6 in. wide can be sealed in one operation, the complete cycle of evacuating, sealing, and ejecting taking 5 sec. Output is 2,000 packets per hr. Pump capacity is 50 cu. ft. per min., and the machine's performance can be increased by 30% if a 100 cu. ft. pump is fitted.

Rockwell Pneumatic Scale, Ltd.
(Stand No. 12A, ground floor, Grand Hall.)

The machines on view are a 4-head *Pneumatron* nett weigher, which is claimed to weigh to within hundredths of an oz. by means of a cantilever assembly whose deflection is measured by an air control device, and a fully automatic inverted air cleaner, which air cleans bottles, jars, or jugs from 3 to 32 oz. at speeds up to 120 per min.

Sauven Perforating Machine Co.
(Stand No. 7, outer row, first floor, Grand Hall.)

This firm is exhibiting *Codedge* label dating and coding machines, power-operated machines which cut code marks on label edges and which handle complete packs of labels at the rate of 2,000 labels per min.; *Codapack* carton printing units; hand, treadle, and power operated perforating machines; *Baselock* units for the rapid marking of cartons, etc.; *Codareel* printing units for attaching to any automatic reel-fed packaging machine; and the *Mini-Mem Rapid* carton overprinting machine for overprinting cartons in a wide range of sizes at up to 500 per min., which is being shown for the first time.

D. Trapow and Co., Ltd.
(Stand No. 6J, ground floor, National Hall.)

This firm are showing a number of their *Newman* labelling and packaging machines, among

which the model 24A semi-automatic bench labeller is entirely new. In spite of its small size, it will apply labels up to 7 in. by 5¼ in. on quart bottles, large tins, etc., label height being up to 6¼ in. from the container base. For a lower height of label, very large objects, such as gallon tins, can be labelled. Another new machine is the model 4B automatic bench labeller, for cylindrical containers only, which has been designed to fill the gap between existing limits of automatic machines for can and tube labelling. The model 3E cap lining machine, designed to insert and press home automatically precut wads of cork, board, or other materials into plastic or metal caps for bottles or jars, can now be obtained with a new adhesive pump as an optional extra. The *Newman Hefix* thermo-plastic bench labeller is being shown for the first time in advanced prototype form.

Viskase, Ltd.

(Stand No. 6, centre row, first floor, National Hall.)

The new *Ty* sausage casing sizer which this firm are showing is claimed to give completely uniform products during high-speed production of skinless sausages even with semi-skilled labour. The casing is fitted over the nozzle of the stuffer and led through rubber-faced jaws and rollers, which are then closed so that during stuffing the jaws automatically regulate the hold-back and the grooves shape the product. The space between jaws and rollers can be adjusted to give the required diameter of the sausage.

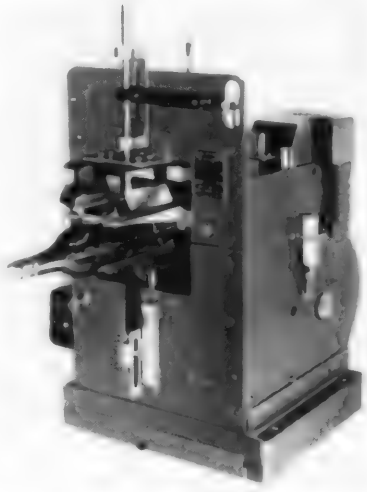
Materials

British Cellophane, Ltd.

(Stand No. 6C, ground floor, Grand Hall.)

On this stand are shown the many different types of *Cellophane* cellulose film (including MXXT A, claimed to be, gauge for gauge, the most moistureproof packaging film in the world), together with various types of polythene, *Polycell* polythene-coated cellulose film, and new polystyrene, polyvinyl chloride, and nylon films.

The Nuvec vacuum sealer Mk. 3 can seal four bags up to 6 in. wide in one operation.



The "Newman" model 24A semi-automatic labelling machine, made by D. Trapow and Co., Ltd., labels square, rectangular or round containers at up to 200 dozen per hour.

British Sidac, Ltd.

(Stand No. 16C, ground floor, Grand Hall.)

This company is exhibiting its wide range of *Sidac* transparent cellulose wrappings, moistureproof and non-moistureproof types, colourless, and in a range of colours. They are also showing a range of bags of various types, unprinted, and printed in up to four colours, together with printed sheets also printed in up to four colours by the Gravure and Flexographic processes. The *M.X.X.T.* and *Q.S.A.T.* qualities of film are being prominently displayed; the former is a cellulose film coated with saran copolymers and the moisture protection afforded is high; the latter film has a high rate of moisture vapour permeability, but can readily be sealed by heat.

Corrugated Packing Materials Co., Ltd.

(Stand No. 5G, ground floor, National Hall.)

On view at this company's stand are various types of corrugated boxes and containers, including pull-through boxes with divisions holding 6, 12 or more bottles or jars. Another speciality of the firm are skillets, collapsible one-piece containers with four flaps top and bottom which are secured after packing by gummed paper, tape, or glue. These can be supplied in various qualities up to 60 lb. railway classification. All boxes are supplied plain or printed in one or two colours.

The John Dale Group

(Stand No. 12C, ground floor, Grand Hall.)

Among the products of the Group's companies to be seen are collapsible tubes in aluminium, tin, and tin-coated lead, rigid aluminium containers with and without screw caps, aerosol and pressure-pack containers in one- and two-piece construction, aluminium and tinplate boxes, lithographic printing of sheet aluminium and tinplate, extruded P.V.C. thin-walled sachet tubing, plastic compression mouldings in ureas and phenolics, and plastic injection mouldings in cellulose acetate, polythene, polystyrene, and polypropylene. Lacquers, coatings, and decorative finishing processes are also on view.

Fisher's Foils, Ltd.

(Stand No. 2F, ground floor, Grand Hall.)

A wide range of foils to different specifications is being shown on

this company's stand, with emphasis on retail packs, especially those made automatically on the latest wrapping machinery. Heat-sealable foil laminates, and *Alseal* for carton overwrapping, especially for biscuit packs, are on view. Some entirely new foils coated with various polythene extrusions are on display, and samples are available in novel finishes. Unlined protective foil for cheese is being shown, and sections are being devoted to foil-paper laminates for products such as butter, choc-ices, wafer biscuits, confectionery, and frozen foods.

The firm are also showing samples of their foil-lined folding boxboard, including some box-covering foil papers, as well as foils printed by photogravure, in line and half tone, produced on the company's foil printing plant.

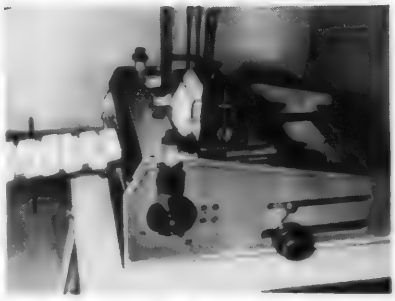
Goodyear Tyre and Rubber Co. (Gt. Britain), Ltd.

(Stand No. 19, inner row, first floor, National Hall.)

A new shrinkable *Pliofilm* is being exhibited for the first time by this company. Marketed by E. S. and A. Robinson under their trade-name *Shrinkwrap*, the process is being demonstrated. The film can be applied by hand or machine, and is claimed to be strong and ductile at low temperatures, to be resistant to puncture by bones and other sharp projections, and to give moisture protection while possessing high gas transmission rate. Sheets of the material are cut wide enough to give 1½-3 in. overlap, which can be spotwelded by handiron or hotplate. Sufficient length is allowed for folding, tucking, welding, or twisting.

The tight wrap is obtained by momentarily heating the package in a hot air tunnel or hot water at about 190°F. In bag form, the material is claimed to hold a partial vacuum.

Samples and information are also available concerning the new metallised *Pliofilm* suitable for electrical and miscellaneous packaging application, and the new SS. 75 grade specially developed for the packaging of fresh meat for sale in self-service shops and supermarkets. A variety of goods wrapped in *Pliofilm* are being shown, as are examples of a recent development, the use of this material as the functional inner ply of a laminate.



The "Mini-Mem Rapid" carton overprinting machine, shown for the first time, can handle up to 500 per min.

The Russell "Invicta" 36 in. screen sieving machine for handling powder at up to 10 tons hr.

Huntley, Boorne, and Stevens, Ltd.

(Stand No. 9L, ground floor, National Hall.)

This firm is showing colourful lithographed tin boxes in various shapes and sizes, original hand-painted models and sketches for next season's trade (from which selections can be made), plain and enamelled special duty non-standard tin boxes, display and advertising media, and storage and work boxes. A new product on show is *Lamiplate*, a metal P.V.C. laminate, available in a wide diversity of colours, grains, and printed effects on tinplate, aluminium, magnesium alloy, etc., with a composite thickness of from 0·014 in. Cans coated internally with this material are claimed to be resistant to alcohol, most acids and alkalis, and many other chemicals; and the laminate is said to withstand temperatures up to 110°C.

Samuel Jones and Co., Ltd.

(Stand No. 6D, ground floor, Grand Hall.)

This company's exhibit deals with the labelling and sealing of unit products and bulk merchandise; fields covered include the use of non-curling gummed papers, the correct grade of *Samson* adhesive with plain label papers for all types of labelling machines, pressure sensitive labels, and thermoplastic labelling with *Imatac* and *Delatac* heat-fix papers.

New products on view are the electric *Tapeshooter* with remote control, which may be set for two lengths; *Takstrip* pressure sensitive kraft tape for instant application; the electric *Tackylabeller* for dispensing tacky labels in roll form; and a wide range of special coatings.

The complete range of *Gumstrip* and *Balestrip* sealing tapes are being shown, claimed to cover all sealing requirements from the smallest parcel to export bales and containers weighing up to 1¼ cwt.

Key Glassworks, Ltd.

(Stand No. 3F, ground floor, Grand Hall.)

This firm is showing a wide selection of food and other products packed in their glass bottles and jars. They also have a special section devoted to new design containers created by their design and sales research staff.

Light Alloy Construction, Ltd.

(Stand No. 4, inner row, first floor, National Hall.)

An entirely new range of *Lacon* light alloy containers especially designed for the handling of all kinds of food is being displayed. These containers are made from heat-treated light alloy, which the makers say does not "mark

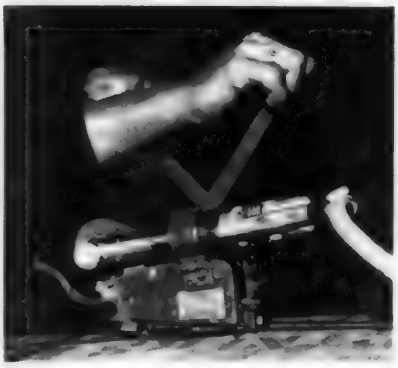
off" and has no soft surface to scratch or absorb dirt. They are claimed to be light in weight, easy to handle, and cheap to repair if damaged. Many of the containers are designed for integration into bin and pallet storage layouts. Other light alloy products on view are *Tracon* one-piece folding containers and *Palcon* collapsible pallet-containers, both of which collapse to one-fifth of their erected size, *Hanbox* K.200 general purpose containers, *Trabox* transport containers, *Bascon* K.250 basket type containers, and the *Dolly* trolley especially designed for the movement of *Hanbox*, *Trabox*, and similar containers.

The Metal Box Co., Ltd.

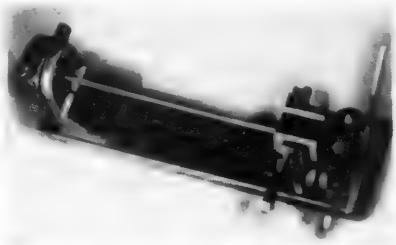
(Stand No. 12D, ground floor, Grand Hall.)

This company is exhibiting a selection of the many varied containers which it makes for packaging—cans for food, beer, cider, and soft drinks, boxes and many other types of tinplate and aluminium containers and closures, labels and cartons of paper and board, bags, bottles, cups, and components made of plastics, and machinery (described in the last section).

The Open Top Group of the company is showing a selection of food and beer cans. The General Line Group is showing many different containers of tinplate and aluminium, among which are the *Autocap* tin, a new sift-proof container for dry and powdered products, the 2 oz. spice container with new plastic reversible closure, the *Neataseal* tin for biscuits, cakes, and confectionery which has a heat sealed diaphragm to take the place of a hand-soldered tagger, the 1 oz. *Nuvac* and *Floseal* tins for vacuum packing, *Quikseal* and *Gardex* aluminium closures for vacuum packing in glass containers, the roll-top jam can with hermetically sealed aluminium lid, and improved aerosol containers. The Paper Group is showing labels, cartons, composite containers and sleeves for multiple packaging, as well as the new *Diotite* carton for frozen foods, which



Seal-less Strapping, Ltd.'s new strapping machine with predetermined pneumatic tension.



The new Ty casing sizer for skinless sausages, which Viskase, Ltd., are exhibiting.

is heat-sealed and needs no overwrapping.

In addition to flexible and moulded containers, the Plastics Group is showing many new developments, among which are super-clear and super-thin *Diothene* polythene film, the latter available in 75 gauge (0·00075 in.), 60 gauge (0·0006 in.), and 50 gauge (0·0005 in.). Among its uses is the wrapping of loaves of bread. A shock-resistant *Diothene* particularly suitable for wrapping potatoes is a recent development. Also on view is *Densothene*, a high-density polythene film having the advantage that prepared foods can be cooked by boiling in the bag. Among the uses of *Metathene*, a *Diothene*-coated cellulose film, is the vacuum packing of bacon rashers and other foods. A big array of laminated packs, in pockets and reel form, is being shown; individually designed for particular products, these consist of laminations of plastic film, aluminium foil, and paper. New developments are *Saran* coated paper having a good moisture resistance, and heat laminated foil and polythene, said to give considerable protection against odours. *Poly-Tainer* plastic bottles can now be multicolour printed, and *Polytubes* (polystyrene tubes) are available in both opaque and transparent form.

Metal Closures, Ltd.

(Stand No. 7H, ground floor, National Hall.)

The chief exhibit on this stand is the *Flavor-lok* seal, for whose manufacture in this country plant is now being installed. This firm have introduced a new feature by producing R.O. "tailor-made" seals with a three-start thread, enabling the consumer to twist off the cap in one-third of a turn. The combination of an aluminium shell with a plastic inner disc to provide an airtight seal became practical only when P.V.C. sheet became available, and this resulted in a one-piece deep R.O. seal with an inner wad of cork and a disc cut from P.V.C. sheet. A later development was the R.O. *Topside* seal, in which the combined cork and thin P.V.C. overlay was replaced by a single wad of thicker P.V.C. The *Flavor-lok* seal embodies two new features, the quick-release thread already described, and a P.V.C. disc which is made by flowing liquid P.V.C. into the cap instead of punching it from tape.

Minnesota Mining and Manufacturing Co., Ltd.

(Stand No. 5B, ground floor, Grand Hall.)

A large proportion of the 3M Company's exhibit is being devoted to the activities of their tape customer engineering service. Also on display is a wide range of manual, semi-automatic, and automatic tape dispensing equipment, and the full range of *Scotch* brand pressure sensitive tapes. Special emphasis is being given to the No. 880 filament tape, designed for reinforcing, bundling, holding, and palletising. The advertising potential of printed tapes is also being featured.

Packaging Trends

Each of these pictures shows a different aspect of modern packaging technology. (Top, left to right): *barbecued chickens are put straight into these Metal Box Co., Ltd.'s paper and aluminium laminated foil bags for taking home hot; collapsible polythene tubes of guaranteed length made by Lacrinoid Products, Ltd.; chopped pork meat with a core of stuffing packed in Viskase, Ltd.'s new vinyl-type plastic film, "Visten."* (Bottom, left to right): *Visual appeal is the theme of Venesta, Ltd.'s four-colour wax-backed aluminium foil wrap for fruit filled choc-ice; one piece aluminium containers recently introduced by Universal Metal Products, Ltd., for aerosol packs; "Netlon" plastic packaging net, heat sealed at both ends, made by Spicers, Ltd., can be used for packing fruit and vegetables and is available in a number of designs and colours.*

National Adhesives, Ltd.
(Stand No. 6G, ground floor, National Hall.)

Together with a complete range of the more conventional adhesives for all packaging purposes, this firm is exhibiting adhesives for labelling many kinds of container (including silicone-treated ones) for hand and machine application, special adhesives for bonding to polythene, P.V.C. and waxed surfaces, adhesives and extrusion primers for bonding and keying a variety of proprietary films, foils, and resins, tear-tape adhesives, including hot-melts, and easy-clean case and carton forming and sealing adhesives which can be readily cleaned off with cold water.

P. P. Payne and Sons, Ltd.
(Stand No. 19, first floor, National Hall.)

Portable semi-automatic bag sealing dispensers, *Rippatape* bag sealing tapes, plain and printed polythene bags, *Jiffytape* self-adhesive cellulose tapes, and a variety of tape dispensers and hand-operated taping machines are among the products exhibited on this firm's stand. New this year are *Rippatape* superseal reinforcing strapping tape and self-adhesive strapping tape; the former is of rayon yarn construction with a tensile strength of 320 lb. to the inch, while the latter, suitable for the heavier kind of container or box, can be overprinted with name and address. *Quickstrap* banding tape is the firm's latest product.

Pembroke Carton and Printing Co., Ltd.
(Stand No. 20C, ground floor, Grand Hall.)

This firm and its associate company, Abbey Display Co., Ltd., are showing cartons, boxes, and display outers in cardboard, folding boxboard, wire, and wood, and are also exhibiting their *Foldmaster* machine working under actual factory conditions.

Reads, Ltd.
(Stands Nos. 6K and 7L, ground floor, National Hall.)

As part of a display of open-top cans, two main methods of can delivery are shown, by bulk containers and by a new method of palletisation for which special fast depalletising machines may be installed in the customer's plant. An elevator and runway system demonstrates on a small scale the type of plant that may be supplied for use between the customer's unloading or depalletising point and the filling lines. The firm are also showing some aspects of their laboratory service, and two closing machines are on display, as well as many different kinds of drum.

Reed Paper Group

(Stands Nos. 13C and 17D, ground floor, Grand Hall.)

A comprehensive range of the products made by the newly formed Packaging Division of this Group is being shown, and in addition the wide use of the various wrapping papers produced by the Group's mills and distributed through E. R. Freeman and Wescott, Ltd., are being demonstrated.

The Reed Corrugated Cases, Ltd., section features a wide variety of solid and corrugated fibreboard cases, straight and spiral wound fibreboard tubes, single faced corrugated fibreboard, and glassine, greaseproof and wax-impregnated papers for food and confectionery.

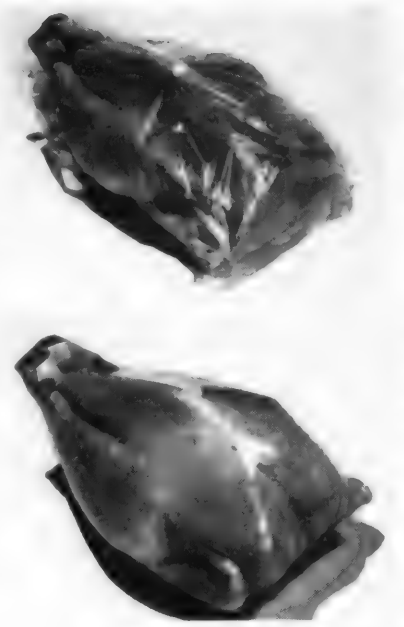
The Medway Paper Sacks, Ltd., section demonstrates the versatility of the multiwall paper sack, and features the Medway *Automatic Sac-Sealer*, claimed to be the first of its type in Britain, and which automatically receives and stitches filled sacks. The carton section features the products of Reed Cartons, Ltd., including a manually operated heat sealing machine for cartons glued with thermoplastic or latex adhesives.

On display for the first time are bread and cake trays manufactured by R. H. Filmer, Ltd. These trays are claimed to be cheap, easily stackable, light to handle, and, because they are disposable, hygienic.

Robinson and Sons, Ltd.

(Stand No. 7K, ground floor, National Hall.)

A new device recently developed by this firm is a carton pouring device, intended for use where a powder or granular material is filled direct into the carton. It consists of a special pouring lip which can be continuously opened and closed for the full life of the carton, and is part of and not a separate addition to the carton blank. Also being shown are a wide range of folding, round and rigid boxes, litho- and letterpress-printed display outers, and wax-impregnated boxes and trays.



A chicken wrapped in "Shrinkwrap," produced from Goodyear "Pliofilm," (*above*) before, and (*below*) after immersion in hot water.

Spesco Developments, Ltd.

(Stand No. 9A, inner row, first floor, National Hall.)

Exhibits featured include a full range of polythene bags, plain and printed in up to four colours, case and sack liners and cut shapes. Available for inspection is a complete range of packs for a variety of goods in *Spescopak* polythene bags, and the semi-automatic Kiss heat sealing machine, designed for the quick sealing of polythene bags up to 12 in. wide, is being demonstrated. Other items include melinex bags and sheet, and acetate boxes.

Metal Closures, Ltd.'s "Flavor-lok" seal has a three-start thread which allows unscrewing in ¼ of a turn, and a P.V.C. sealing disc which is flowed in while liquid.

Venesta, Ltd.

(Stand No. 4D, ground floor, Grand Hall.)

The increasing versatility of aluminium foil and collapsible tubes is being demonstrated by the combined display of this firm and Empire Aluminium Co., Ltd., which includes the use of aluminium foil for many kinds of food. A variety of collapsible tube incorporating specially developed applicator nozzles is being shown. The food section shows a number of recent innovations in the use of foil packs, among which is the direct printing of labels on foil for cheese wrapping. Examples of butter wraps printed on the dull side of the foil are displayed, together with many specimens of capping strip for milk bottles. Emphasis is placed on the foil heat seal coating process developed by this firm, claimed to give a higher standard of protection and sales appeal for chocolate bars.

Viscose Development Co., Ltd.

(Stand No. 9, inner row, first floor, National Hall.)

Seals manufactured and marketed under the names *Viskaps* and *Viskrings* are being featured on this stand. These shrink to fit the bottle neck, sealing the primary closure. Their prime function is to provide a safeguard against pilfering and contamination of the product, but they are becoming increasingly important in package design, and recent developments in printing techniques allow *Viskrings* to be printed in up to four colours and to reproduce intricate trade mark designs. To keep the main portion of the seal intact while allowing removal of the stopper, perforated *Viskrings* have been introduced; these are perforated with a row of slots or minute holes so that a strip about ¼ in. wide can be peeled off the top leaving the bulk of the seal intact complete with advertising slogan, brand name, or trade mark.

Spontaneous Heating of Fish Meal—1

By C. J. H. van den Broek*

Why does spontaneous heating occur in fish meal? What precautions can be taken to eliminate its hazards? The state of present knowledge is reviewed by the author, who shows that heating is of two kinds, "normal" and "accidental," the former the result of fat oxidation and the latter caused both by delayed oxidation and by microbial action. Preventive measures are described, covering methods of production, storage and stowage aboard ship.

SOME years ago a freighter arrived in one of the main ports of Europe loaded with fish meal from Africa. A day before arrival fumes were noticed coming out of the exhaust ventilators of some of the vessel's holds, and soon after these holds had been opened for unloading a fire broke out, causing excessive damage to both cargo and ship.

This was but one of the more serious of many cases of heating of fish meal which have become known in the last decades. The details of this particular instance need not concern us here, but the case led to a study of existing knowledge in the field, the outcome of which is presented below.

I. The Phenomenon of Spontaneous Heating

Heating is regularly observed in all meal, produced from fatty fish such as herring, pilchard, brisling, etc., immediately after manufacture. In addition, such fish meal may heat spontaneously during storage or transport. For practical purpose, one could distinguish between: (*a*) normal spontaneous heating and (*b*) accidental spontaneous heating.

1. Normal spontaneous heating

As long as meal has been produced from fatty fish, it is known that a sharp increase in temperature occurs immediately after the meal is dried.[1] Difficulties arising from such heating are quite widespread and well known to fish meal producers. The amount of heat produced varies with the type of meal (meal from non-fatty fish does not show this particular kind of heating), the fat content, the method of manufacture, etc.[2]

As early as 1939, Harrison[3] published temperature graphs of meal stored in bags (Fig. 1). These graphs demonstrate a rapid increase in temperature of 50-100°F. (30-50°C.) within the first 6-12 hr. after the meal was dried. Similar graphs are presented by Bakken,[1] Kyte,[4] and Meade.[5] Very illustrative is the latter's temperature graph for dried scrap spread out on a floor and turned over at regular intervals. This graph (Fig. 2), which is derived from commercial production, shows clearly that temperature in-

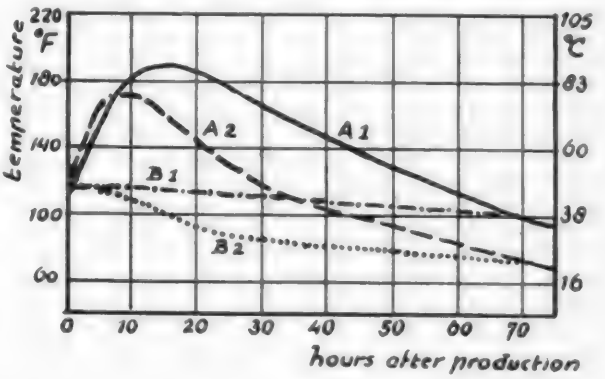


Fig. 1. One of the first graphs published to show heating of stored fish meal. A — burlap bags; B — paper bags; 1—stowed in pile; 2 — standing on floor. (*After Harrison.*[3])

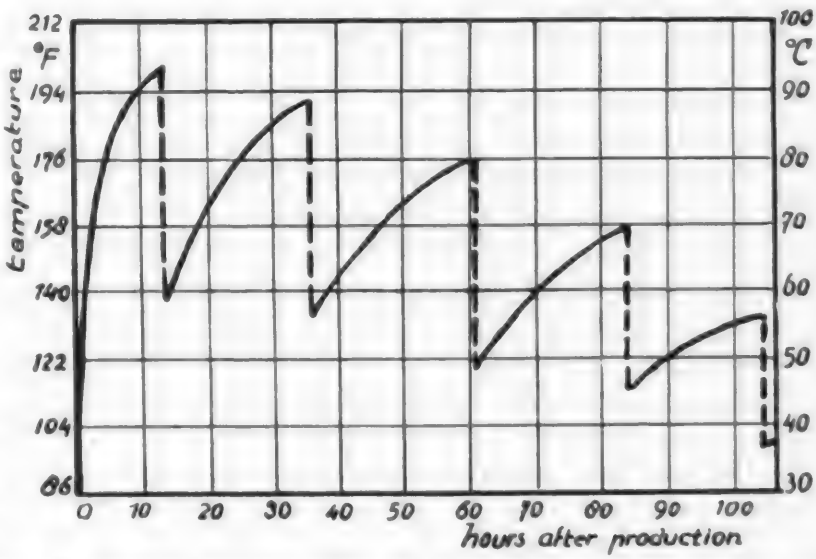


Fig. 2. Temperature changes in dried scrap spread out on a floor and turned over at regular intervals. (*After Meade.*[5])

* University of Utrecht, Holland.

crease begins immediately the meal is piled so that heat production must have been in full swing the moment it is taken out of the drier and probably before, and that without turning (*i.e.* cooling) the meal will rapidly attain a dangerously high temperature.

The process by which the meal is left exposed to the air until the self-heating has subsided is called "curing." It is generally understood that only well-cured meal should be shipped in large quantities.

2. Accidental spontaneous heating

Under some conditions, fish meal prepared from apparently "cured" scrap or meal which has been stored for a long time in bags at apparently constant and normal temperature may show a sudden increase of temperature.[5, 6] This type of heating has also been known as long as herring meal has existed, and has, because of its accidental character, sometimes produced disastrous effects like the one cited in the introduction.

3. Fire hazard

With both types of heating it has been observed that very high temperatures can be reached, which may lead to ignition. Statements to that effect are found in practically every paper dealing with the matter.[1-10]

In one instance, temperatures were measured of an insufficiently ventilated ship cargo which was unloaded after a 24 day voyage; the inside bags had a temperature of 170-190°F. (75-87°C.).[11]

4. Appearance of heated meal

Below combustion point, heat damage to the meal is shown by a darkening of the colour as the temperature is raised. The meal gradually becomes caked into a dark brown solid mass and may become completely charred in the end.[1]

Bowes[7] discusses the means of distinguishing fires starting in the interior of a stack of bags of fish meal due to spontaneous heating, from fires caused by external ignition. In the first case, heating is likely to be ubiquitous and will only be less pronounced in the outer layers of the stack because heat removal there will be greater. Therefore the most damaged meal will be found at the centre of the stack, and from there outwards a gradual change into less damaged meal will be observed. With fire caused by external sources, the boundary between damaged and undamaged meal will be more sharply defined and there would be relatively few bags of meal uniformly damaged throughout.

Although neither colour nor odour can be used as a reliable index of lowered nutritional value, it has been clearly shown that heated meal has a markedly reduced biological value and a much increased percentage of undigestible nitrogen.[12, 13]

II. Factors Involved in Spontaneous Heating

1. Composition of fish meal

The standard method for producing fish meal consists of cooking the raw material, pressing the cooked mass, separating the oil from the expressed liquid, and dehydrating the pressed residue ("press cake"). Equipment and methods vary from very primitive (wood-fired open cooking vats, crude hand-operated presses, sun-drying) to very ingenious, continuous and fully mechanised ways of production (comprising continuous steam cookers, helical presses, centrifugal oil separators, rotary steam and/or hot air driers, grinders, and conveyors).[3, 14]

The composition of the product shows considerable variation, depending primarily on differences in the fat content of the raw material and secondarily on the method of production. A good fish meal made from fatty fish should not contain more than 10% of moisture.[14] The fat content depends more or less on the initial fat content in the raw material, but at least so much fat should be removed by efficient pressing that the remainder does not constitute more than 10% of the final product.

In the dried meal, ash (from the bones and scales of the fish) is an important figure in the composition; if the meal is made from fish offal (mainly bones), the ash may be as much as 25% of the total weight. Impurities may account for a certain percentage; in the main these consist of sand, either from contamination during hauling into the factory or picked up in sun drying; both causes point to rather primitive methods of manufacture. Salt may be present in large amounts if sea water is used to slush the fish into the factory and is insufficiently washed off before drying.

The remaining material is protein, and this is the only component on which the price of fish meal is normally based.

Olafsson,[2] who studied the changes in herring meal during spontaneous heating quite extensively in 1953, states that "the heat production is indicative of great chemical changes taking place in the meal. It is reasonable to assume that the principal chemical change taking place is the oxidation of the fat of the meal."

This statement, though in the main correct, may be an oversimplification. Since, in 1955, a fundamental investigation into the spontaneous heating of fish meal was begun by the Fish Industry Research Institute, Cape Town, South Africa,[15-17] a great many facts have become known, showing that the underlying processes are more complicated than was expressed by some of the earlier authors.

For the sake of clarity, the more prominent factors will now be discussed successively.

2. Fat

It is now generally understood that *normal spontaneous heating* is caused by an oxidation of the fat, *i.e.* the residue of oil which is left in the meal after the cooked material is pressed. In the final product this oil may be present in amounts varying from 5 to 12%.[3] Fish oils, being mainly composed of "unsaturated" fatty acids, are capable of being readily and extensively oxidised, and Olafsson found that the fat remaining in

the press cake during fish meal production is even more unsaturated than the oil pressed out.[2] Heated meal gives off a rancid smell indicating excessive oxidation of the fat.[1]

The opinion that the fat in the meal is a possible cause of spontaneous heating has in recent years been suggested by many practical and scientific observations. Thus, the tendency for spontaneous heating has been stated to be greater in meal with a higher fat content and is less in meal made from less oily fish;[18] this statement, however, was not based upon comparative measurements. In Norway, meal made from the fatty summer herring was found to be more liable to spontaneous heating than meal made from the less fatty winter herring.[1] Fish meal with an artificially increased fat content showed a higher temperature rise and a slower return to room temperature than normal meal.[19]

The oxidation of the fat has been confirmed by chemical evidence. Chemical tests on the fat in meal made from Norwegian summer herring showed that a number of striking alterations take place in the fat molecule on heating, which points to an oxidation of the molecule. Other chemical tests made it very likely that this oxidation is *not* caused by micro-organisms such as bacteria.[1]

In South African pilchard meal, the amount of fat extractable by hexane decreased, first rapidly and thereafter more steadily, during storage of both full and ordinary meal.[20] Similar findings are reported by Almquist.[12] Not only the petroleum-ether and ethyl-ether extractable fat decreases during storage, but also the amount of digestible protein. Both changes seem to be caused by oxidation, as both were reduced when the meal was kept in sealed glass tubes.

In recent years, this view has found support from an entirely different angle. First, Meade reported that an antioxidant such as is used to prevent the oxidation of fat in foods, if added to fish scrap, can inhibit heat production almost completely. N,N'-diphenyl-p-phenylene-diamine (DPPD) was added in quantities of ½ to 1 lb. per ton of menhaden scrap and no heat was generated by such scrap either immediately after it left the drier or after it had been quickly cooled before being cured[5] (see Fig. 3).

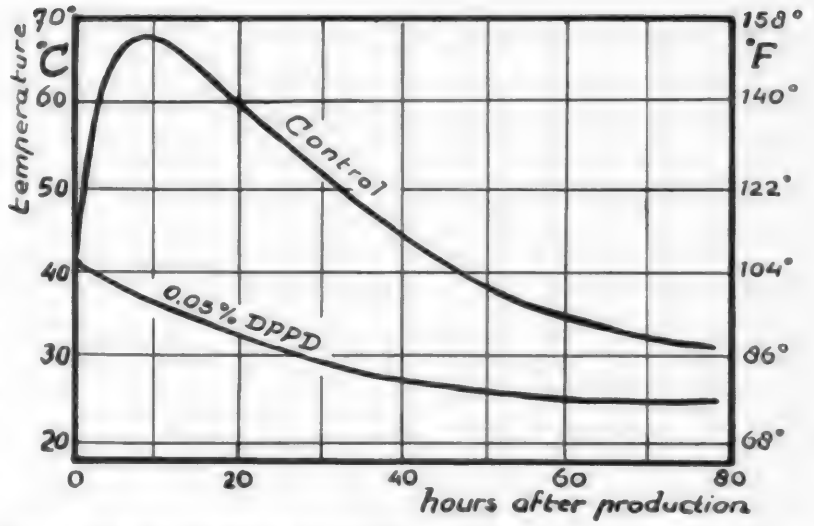


Fig. 3. The lower curve shows the effect of adding an anti-oxidant (DPPD) to menhaden scrap. (*After Meade.*[5])

A similar use of 1 lb. of butylated hydroxytoluene (B.H.T.) added per ton of menhaden scrap as it left the drier led to equally favourable results.[21] The scrap was heaped in piles of about 3 tons; in a pile of B.H.T.-treated scrap, the temperature did not rise above 117°F. (47·4°C.) within 15 to 40 hr., whereas in the pile of untreated scrap, the temperature rose within 15 hr. to 208°F. (97·8°C.) so that the scrap had to be turned over to prevent combustion.

Kyte[1] demonstrated that the addition of "Santoquin" (6-ethoxy-1,2-di-hydro-2,2,4-trimethyl-quinoline) sprayed over the press cake or over the dried scrap during Alaskan herring meal production prevented heating of the meal to such an extent that bulk shipping immediately after drying was thought to be possible.

When Dreosti and Rowan[17] repeated the experiments with B.H.T. added to pilchard "half" meal, the effect was not nearly so striking as the test cited above, but in this case the antioxidant was not added to the meal or the scrap right at the factory.

Thus, there is ample indication that spontaneous heating is caused by fat oxidation. However, it became apparent recently that not all the fat in the meal could be held responsible for spontaneous heating. Meals with the same percentage of hexane-extractable fat may show widely different rates of heat production, and vice versa.[17] It would seem that only a minor fraction of the total fat in fish meal is instrumental in causing spontaneous heating. Such seasonal variations as were observed in Norwegian herring[1] would then depend on such minor fraction only and bear less relation to the total fat content. This, at least, would explain why in South African pilchard meals similar variations in heating rate have been observed[16] without any apparent difference in extractable fat content.[17]

It may well be that the undetected presence of such fraction has been the cause of many controversial statements on the influence of oxygen and processing on spontaneous heating (see below).

3. Oxygen

As spontaneous heating is largely due to an oxidation of the fat in the meal, the amount of

oxygen available must at all times be a determining factor in the rate of this process.

Dreosti observed in an early experiment that aeration of freshly prepared pilchard meal resulted in a rise of temperature of 8°F. (4°C.); re-aeration at weekly intervals gave gradually diminishing temperature rises. Identical meal which had been kept at 114°F. (46°C.) did not heat upon aeration.[8] Apparently, at this higher temperature, the rate of oxidation of the fat had been so great that after one week it was already fully oxidised. When, in an experiment made by the British Fire Protection Association, no heating was observed on aeration at 212°F. (100°C.),[7] this could be explained by the fact that in this older meal fat oxidation was already completed.

When during the war jute bags became scarce, industry turned towards multi-layer kraft paper bags for the transport of dry meal,[9, 10] and soon found that in such bags spontaneous heating was greatly reduced. In 1946, Butler (*Comm. Fish. Rev.*, **8**, cited in[1]) commented on these experiences, and Bakken[1] confirmed his findings experimentally for Norwegian herring meal which was stored in bags made impervious to air by impregnation: in the latter almost no heating occurred, while in normal kraft-paper bags the temperature rose from approx. 86°F. (30°C.) to well over 180°F. (80°C.) within 10 hr. of bagging.

In their turn multi-wall paper bags inhibit heating of fish meal more efficiently than burlap (jute) bags,[10, 18] and Pigott[10] even considers an asphalt ply in paper bags "necessary in long distance shipping to reduce fire hazards caused by the heating of the meal."

Experiments in South Africa[22] again demonstrated a complete inhibition of heating in air-tight bags. Kyte[4] demonstrated in a model experiment with herring oil spread on an inert support that spontaneous heating does not reoccur when this meal had already undergone spontaneous heating. He concludes that if the oil in the herring meal reacts in a manner similar to the oil in his experiment, herring meal might be stored without the occurrence of accidental spontaneous heating by allowing the meal to go through the normal spontaneous heating before storage.

Apparently, the *normal spontaneous heating* in freshly prepared fish meal goes on until the oxidation of the fat has come to completion and it is this that happens in the process called "curing."

If, however, the process of oxidation is in some way inhibited immediately upon production of the meal (*e.g.* by a very quick cooling) and the meal is therefore insufficiently "cured," *accidental spontaneous heating* may occur suddenly after the meal has been stored for a longer or shorter period. In such cases it is, however, often difficult or impossible to indicate which factor has been the immediate cause of the heating, because, as shall be shown below, factors outside those connected with the fat oxidation may also be involved.

That this matter also has its complications appears from later findings by Dreosti, that in meal kept in polythene lined bags curing was not retarded.[15] Presumably, the retarding effect of such liners becomes manifest only at the higher oxidation rates at higher temperatures.

4. Temperature

Like all chemical reactions, the oxidation of the fat in meal, which causes *normal*, and sometimes *accidental*, spontaneous heating, is quicker at higher temperatures. Hence, also the rate of heat production will be greater the higher the temperature.

As soon as their long-term research on heating of fish meal was launched, Dreosti and Rowan endeavoured to verify experimentally their earlier estimates of heat production in fish meal.[6, 17, 23, 24] Samples of various fish meals were enclosed in an adiabatic calorimeter[15, 16] and the temperature rise was accurately measured by an electronic temperature controller from the surrounding water.[25] In all cured meals the rate of heat production increased steadily with temperature: the increase was followed up to a temperature of 178°F. (80°C.), at which level it was still increasing. The relationship was not logarithmic (at higher temperatures somewhat lower than would be expected from a strictly logarithmic relationship),[15] and some heating curves, obtained later, were even almost linear.[17] So far no simple relationship has been found between the rate of heat production and the temperature of the meal.

As expected, heat production at any one temperature is very high immediately after manufacture and decreases as curing progresses, first quickly, then more steadily. The first figures, although derived from different batches of meal, clearly show this trend: at 125°F. (51°C.) heat production 24 hr. after manufacture was as high as 5°F./hr.; after several weeks it slowly descended from 0·9°F./hr. after 30 days to 0·5°F./hr. after 80 days.[15] A more complete picture was published a year later[16] showing (Fig. 4) that both for ordinary and for whole pilchard meal, as well as for maasbanker whole meal, the rapid initial decline in heat production was finished well within the 4 weeks recommended earlier by F.I.R.I.[26] to interpose for "curing" between manufacture and shipping. The graphs also demonstrate that even after 2 months of curing the rate of heat production is still falling off.

Contrary to expectation, it was found that whole meal is less reactive than ordinary meal.[16, 17] One might suppose that in whole meal part of the reactants (fatty acids?) have become shielded or protected by the added solubles. The ratio:

$$\frac{\text{heating rate of ordinary meal}}{\text{heating rate of whole meal}}$$

was, in a test with pilchard meal, 1·7 after 10 days' curing and 1·6 after 43 days'; in a test with a very reactive maasbanker meal it was 3·1.[17]

The special effect of short-time heating is more conveniently discussed under the next heading.

5. Processing

During the drying of the press cake the material is finely divided and brought into an intimate contact with hot air, so that conditions for a direct impact of the oxygen on the fat in the meal are exceptionally favourable.[2] Many scientists working on the problem imagine that under such circumstances the fat in the meal is "activated" in some way and that after or because of this activation, as the dry meal is cooled and finally stored, the fat goes on combining with the oxygen of the air. The chemistry underlying this activation is, however, still far from understood and explanations are sometimes contradictory.[2, 6]

It is not surprising, though, that the degree to which the fat is "activated" and, subsequently, the rate with which oxygen combines with the fat in the dry meal to produce heat, is to a fairly great extent determined by the method of preparing the fish meal.

According to Flood[18] "herring meal which has been produced in steam-heated driers or by vacuum drying has less tendency to oxidise than meal which has been produced in flame driers," but his explanation that the latter has had, during the drying process, a more intimate contact with oxygen, the oxygen being considered the "activating" agent, seems doubtful. In this context, Olafsson's assumption[2] that the heat is the principal "activating" agent seems, in the light of his experiments, somewhat more likely and would also explain the observation by Flood. Olafsson further found that peroxide values increased more strongly the more the meal was dried, especially below 10% of moisture. Possibly, in such very dry meal the oxygen has a better access to the meal fat.

(*to be continued*)

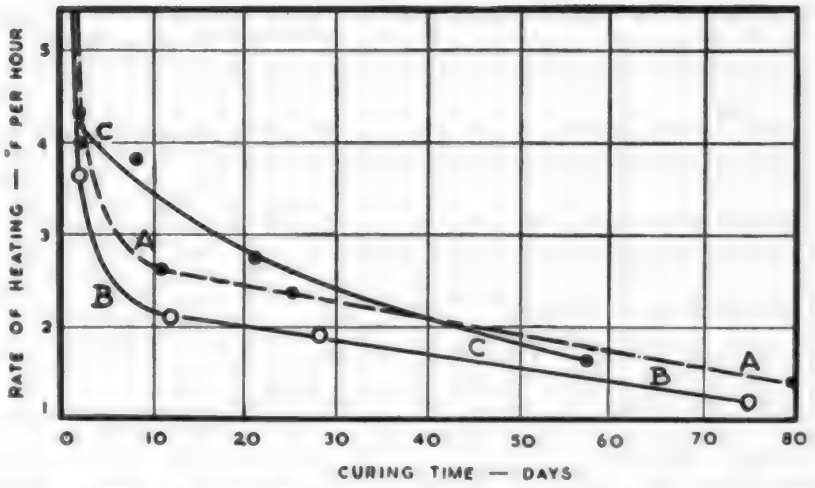


Fig. 4. Decrease in the rate of heating with curing time: A—in pilchard ordinary meal; B—in pilchard whole meal; C—in maasbanker whole meal. (*After Dreosti and Rowan.*[16])

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* F.I.R.I.: Fishing Industry Research Institute, Cape Town, South Africa.

† SSF: Sildolje- og Sildemelindustriens Forskningsinstitut, Bergen, Norway.

Assessment of the Strawberry Crop

IF you want an event to run strictly to a timetable, do not invite the television cameramen! This seemed to be the moral of the annual midsummer strawberry assessment trials held by the B.F.M.I.R.A. at Leatherhead, when this year for the first time, the general public were allowed to see the work on the strawberry crop through the eyes of the press, radio, and television representatives. Indeed, so completely were the proceedings commanded by the Terrible Twins, the cameramen of the B.B.C. and I.T.A., who moved in unison as if tied together, not yielding each other an inch of film in their anxiety to get the same shots from identical viewpoints, that at one stage the lecturer, Dr. A. McM. Taylor, B.SC., PH.D., F.R.I.C., who was valiantly trying to supervise the making of a trial batch of strawberry jam and explain the procedure at the same time to the invited audience, slumped into a chair in the front row and exclaimed, "It's no good; I can't go on!" Further pointed remarks of a more personal nature failed to move the terrible twins, who imperturbably made the long-suffering demonstrators repeat their actions again and again until their shots, we hope, were just right. Incredibly, in spite of the distractions, the jam produced by Dr. Taylor's staff was exemplary, and Dr. Taylor was eventually, by kind permission of the cameramen, allowed to finish his lecture in peace. The audience watched these activities with good-humoured tolerance, having been filled with strawberries and cream (and other refreshment as well) at the New Bull Hotel in Leatherhead after a pleasant morning in the Hampshire countryside.

Cloudy skies fortunately did not release their threatened rain to mar the watching of strawberry picking at Kingsley Fruit Farm, near Bordon, Hampshire, where the party had assembled early in the morning. Moving on to Headley Mill Farm a few miles away, the party was shown the many varieties of strawberry plant grown there. In the afternoon, after the little bit of cordiality at the New Bull already referred to, the party gathered at the Association's headquarters in Randalls Road to watch the making of an experimental 5 lb. batch of strawberry jam. Dr. Taylor explained the salient points of strawberry assessment. First the fruit are examined for shape, colour, size, and ease of calyx removal, then jam is prepared by a standard technique, and finally the jam is assessed by a panel of experts for appearance and flavour.

Because the strawberry season is so short, it is quite common for a jam manufacturer to receive in one day alone more than 10% of his fruit requirements for a whole year, said Dr. Taylor. From a handling point of view, it is there-

(*Concluded on next page*)

Stages in assessing the season's strawberries at the B.F.M.I.R.A. at Leatherhead. (*Top, left*): Fruit sampled at random is halved, the halves being then impressed on a sheet of absorbent paper as a record of shape and size. Ease of calyx removal and colour are also noted. (*Top, right*): Standard jam is then made from the fruit; fruit is being added to syrup in a steam-jacketed boiling pan, the contents of which (*bottom, left*) are then boiled to specified weight. (*Bottom, right*): An expert assesses the flavour and appearance of the jam in a tasting booth.

BOOK REVIEWS

All About Packaging

THE fifth edition of the *Packaging and Display Encyclopædia** contains as much information about the subject of packaging as the person who has to pack things is likely to need; if his problems are special ones, at least it will tell him where to go to obtain advice. Under the editorship of H. A. Dossett, contributions from 58 experts cover the entire field. Latest developments, such as the question of containers for food during and after the process of irradiation for preservation purposes, food in collapsible tubes (including plastic ones), produce prepackaging in the factory, bottling and canning trends, new forms of closures, and plastic containers for food, are among the items of direct interest to the food manufacturer; while in addition there is a comprehensive review of packaging machinery, sections on glues and adhesives, insurance and transport regulations, printing inks, and design and exhibition, and general information such as institutes and associations. The book concludes with a glossary of terms, a classified buyers' guide, a directory of firms and a names index.

* *Packaging and Display Encyclopædia*. George Newnes, Ltd., London, 1959. Pp. 705. 84s. net.

Absorption Spectrophotometry

THE present edition of G. F. Lothian's "Absorption Spectrophotometry," a book first published in 1949, has been almost completely rewritten to cover developments since that date. It is divided into three parts, dealing respectively with the principles, the applications, and the technique of spectrophotometry. Systematic colorimetric tests can be applied both qualitatively and quantitatively in analysis, and the use of light-absorption methods in industrial as well as research laboratories is increasing. Such methods are useful in the estimation of many drugs, vitamins, and natural substances such as proteins and the pigments of living cells. The text is very readable in style and the work is lavishly provided with half-tone illustrations. As well as a subject index, a useful feature is a combined bibliography and author index.

* *Absorption Spectrophotometry*. By G. F. Lothian. Hilger and Watts, Ltd., London. 1958. Pp. 246. 52s. net.

Canning from A to Z

WHEN this work* first appeared in 1902 as a serial article in the pages of *The Canning Trade*, there were, in point of numbers, as many canners in the business as there are today, but the industry was in its infancy, for production was but a fraction of today's, markets and profits uncertain, and business mortality heavy. Then, the industry had little scientific knowledge to assist it; today, "it fairly reeks with it." All the great canmaking companies have laboratories and highly trained specialists; Government and industrial research stations abound, all working on food preservation problems, and, in America, whence this book comes, each State has one or more Agricultural Experimental Station to study the problems in its own particular locality.

Starting with a chapter devoted to general considerations—buildings, equipment, can sizes, labels, canning procedures, types of retort, sampling and testing, regulations—the book deals in turn with various classes of product—vegetables, fruits, canned juices, fish, dry packs, meats, soups, milk preserves, pickles, specialities, ending with a chapter on dog and cat food. The large number of formulæ, originally compiled from entries for a competition carrying large cash prizes, have been continually brought up to date throughout the eight editions of this work, the last revision being made with the help of the combined studies of many leading laboratories.

As pointed out in the introduction, old recipes do not change, but methods and means of handling have changed and should be known to every operator. A useful feature of the book is the diagrams of canning lines.

* *A Complete Course in Canning* (8th Edition). The Canning Trade, Baltimore. December, 1958. Pp. 403. $15 net.

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Strawberry Assessment

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fore very important that the fruit have calyxes which are easily removable, as this job must be done by hand. The standard jam was made by adding 1,590 g. of sugar to 170 ml. of water and heating until dissolved. 950 g. of fruit were added and the mixture brought to the boil. 14 g. of fat (margarine) were added to prevent frothing, and 5 min. after the start of boiling 250 g. of 5% apple pectin solution were poured in. The timing of the pectin addition is important, as too early addition will result in pectin degradation, and if too late the pectin's gelling properties will not develop sufficiently. The jam was then boiled down to a weight of 2,500 g., and after some cooling was poured into jars. These were sealed and sterilised in a steam oven.

Assessment of the jam is made by experts from member firms of the Association, and the important points of this procedure were outlined by Mr. W. Birch of James Robertson and Sons, Ltd. Afterwards, tasting tests were carried out in the special booths set up in the laboratories for this purpose.

Radioactivity in Man and Milk

By Michael Lorant

Los Alamos scientific laboratory in New Mexico is conducting a far-reaching and world-wide study of fall-out radioactivity in milk and people to find out its hazards.

LOS ALAMOS scientists are now in their fourth year of a programme to study the radioactivity from fall-out in milk and in human beings. Directed by Dr. Wright H. Langham and Dr. Ernest C. Anderson, of the laboratory's biomedical research group, the research is sponsored by the U.S. Atomic Energy Commission, and involves the week-by-week measurement of a radioactive fission product, cæsium 137, in people and in dry milk samples from 47 cities in U.S.A., 12 in Canada, and 13 in other countries.

The instrument used to measure the minute amounts of radioactivity in the samples is a liquid scintillation detector, in which the gamma-rays emitted by cæsium 137 are absorbed by a solution of photo-emissive chemicals which emit light in proportion to the amount of radiation absorbed, the amount of light being recorded electronically.

Milk was chosen for study because its rate of assimilation of radioactive matter is greater than for other foods, and its local production makes its source and the date of collection easy to record. The cæsium content of people has shown a definite correlation with that of the milk in the area in which they live, and although readily detectable with the laboratory's instrument, has remained far below the permitted maximum.

Last year 839 people of all ages from 37 states and 15 foreign countries were measured with the instrument. Although cæsium 137 measurement is not a substitute for studies of strontium 90, the leader of the laboratory's health division, Dr. Thomas L. Shipman, said that the information collected plays an important part in the U.S. Atomic Energy Commission's programme for the study of world-wide fall-out. Both isotopes are major constituents of distant fall-out from nuclear explosions, and both fall to earth in about the same proportions and are absorbed into the human body through food.

Because strontium 90 emits only beta rays, the difficult and time consuming method of chemical separation necessary makes estimation laborious, whereas the easy measurement of gamma rays emitted by cæsium 137 allows the fluctuation of fall-out intensity to be quickly and accurately indicated by both geographical location and date. From this information, the strontium 90 can be estimated.

According to Dr. Shipman, the cæsium isotope may prove to be as great a biological hazard as strontium 90, for although it does not lodge in the bone as does the latter, it distributes itself throughout the body's muscle mass where it can damage the reproductive organs.

(Left): **Mr. Robert Schuch, member of the Los Alamos Scientific Laboratory staff, places one of the weekly milk samples in the liquid scintillation detector.** *(Right)*: **Dr. Ernest C. Anderson with samples of dried milk. The 50 lb. drums represent the samples for one week. From each drum a small quantity is saved, and the cans represent about two months' accumulation.**

Take-over Bids

By Lord Meston

WE hear a great deal nowadays about transactions which are commonly known as "take-over bids." The figures mentioned usually run into millions of pounds (sterling), and one wonders where some of the financial wizards find the money. But one wonders more, not so much at the amount of money involved, but at the methods employed by the "bidders," and cannot help asking the question whether such methods are within the Law.

Let us say at once that there is nothing illegal about an ordinary "take-over bid." As we know, this type of transaction involves a change of control of a company through purchase of its shares by an outsider. To achieve this purpose the outsider makes a bid for the shares which have voting rights. In other words, the control of a company is "taken-over" by such a bid.

The individual carrying out this operation—namely, the "take-over bidder"—may obtain control of a company simply from a desire for power or ultimate personal gain, or he may operate in this fashion in order to enlarge, and extend the activities of, another company of which he is already a director and virtual owner.

There may be little or no objection to a take-over bid. When a person who is already a director and shareholder in a company merely acquires a controlling interest in the same company and so becomes the virtual owner of the undertaking, of course, there may be strong personal objections to such a proceeding, but the public mind is not likely to be stirred by what may be regarded as a domestic matter.

However, when an outsider, that is to say a person who is neither a director nor a shareholder in a company, acquires a majority or controlling interest in the shares of that company, different considerations may arise. The public may become alarmed at a person obtaining control of a company, about whose business he probably knows nothing or cares less, and may want to know what is the motive behind the take-over bidder's action.

In order to obtain control of a company the take-over bidder must acquire a majority of those shares with voting rights. This involves offering the shareholders a sum of money in excess, and indeed substantially in excess of the existing market value of the shares. The shareholder is faced with the alluring prospect of selling his holding at a substantial profit. This is a very tempting inducement to most people, and it is not surprising that shareholders often accept the offer in such cases.

The technique employed by the take-over bidder may vary according to circumstances, but the following is a simple example. The bidder casts his eye on a certain company where the share capital consists of ordinary shares and half as many preference shares, both types of shares having the same nominal value—namely, £1. The history of the company for the preceding five years shows that 5% has been paid by way of dividend on the ordinary shares. The bidder decides that he will offer 30s. a share for the ordinary shares.

The bidder must find out who holds the shares. These may be held by a comparatively few people or may be widely spread among the public.

The bidder will probably start operations by buying some of the company's shares, not in his own name but in that of a "nominee." But he will be careful to buy only a comparatively small number of shares by this method as he wants to avoid driving the price of the shares up suddenly and thereby causing bid rumours to start circulating. Moreover, the directors would soon notice, through the registration of new shares, that some unknown person was accumulating shares.

The bidder will now contact the board of directors of the company with an offer of 30s. for the ordinary shares. The board may react favourably to this proposal or otherwise. At all events, the bidder cannot stand still. After a few days he sends out his formal offer. This states the price he is bidding and any relevant details about the future of the business. The offer will also announce the date by which acceptance must be received by the bidder. The usual stipulation is 90% acceptances or such lesser proportion as the bidder is willing to accept.

The acceptances may come in gaily and the directors may recommend the offer made by the bidder. Then all is plain sailing.

On the other hand, the directors may strongly oppose the efforts of the bidder to obtain control of the company. In that case the bidder will have to go to shareholders over the directors' heads, and then the band begins to play.

In every case the directors of the company which is "taken-over" must act with great care. Any payment received by the directors of the company (whose undertaking is purchased) must be accounted for to that company. It is unlawful in connection with the transfer of the whole or any part of the undertaking for any payment to be made to a director by way of compensation for loss of office, or in connection with his retirement *unless this has been disclosed to the members and approved in general meeting*. If this is not done the amount received is to be held on trust for the company.

In regard to payments "by way of compensation for loss of office or in connection with his (the director's) retirement from office," a payment is presumed to be by way of compensation if made in

(*Concluded on page 359*)

Advances in Food Technology

CANNING

Use for Chlorine dioxide

Studies have been carried out into the feasibility of using chlorine dioxide for treating once-used water in pea and corn canneries and thereby controlling the bacteria and slime formation. The persistent residuals and the lack of reaction with ammonia nitrogen residuals made possible a one-point application rather than multiple-point application as used in the rechlorination of used water. The bactericidal residuals maintained in used water did not result in the generation of offensive odours in the factory nor did they appear to cause off-flavour in the product. Total bacteria counts on the product were significantly lower when chlorine dioxide was used.

It was not considered that chlorine dioxide was more effective than chlorine in controlling thermophilic flat-sour spores. Chlorine dioxide residuals were more easily maintained in the presence of organic matter without the generation of nitrogen trichloride and it was therefore thought that chlorine dioxide was the more effective sporicide.

Substantial saving in the amount of water used in the cannery may result from the reuse of water treated with chlorine dioxide to control bacteria.—J. L. Welch and J. F. Folinazzo, *Food Technol.*, 1959, **13** (3), 179.

DAIRY PRODUCTS

Fat Content of Milk

A new German instrument (manufactured by Loede and Co., Drabenderhöhe, nr. Cologne) designed to measure the mean fat content in the milk supply to dairies by means of samples has been tested by the German Federal Milk Research Institute, Kiel. Two of these instruments were installed in the training dairy of the Institute. It was found that, with small quantities, the sample automatically taken by the apparatus was not strictly proportional to the total quantity of the milk unless the static pressure and flow conditions were identical. To determine the measuring accuracy of the apparatus, the milk from two transports was thoroughly tested on 21 days.

The results obtained with the sampling instrument were found to be accurate within a tolerance of 0·05%. But such accuracy can only be obtained if the apparatus is suitably calibrated in each individual case.—G. Wälzholz and H. Quest, *Deutsche Molkerei-Zeitung*, 1959, **13**, 447.

Milk as Vitamin D Carrier

People of all age groups are liable to suffer from vitamin D deficiency. The natural vitamin D contents of many of our traditional nutrients are too low to make up the deficiency. It is therefore necessary to enrich them artificially. Milk is particularly suitable as a vitamin D carrier as it reaches the greatest number of people in one form or another. The problem has been investigated in great detail by the Research Institute for Milk Vitaminisation at Frankfurt-on-Main. Systematic tests, including controlled tests on rats, have shown that ultra-violet irradiation is to be preferred to the admixture method.—F. K. Hiller, *Deutsche Molkerei Zeitung*, 1959, **80**, 659.

DAIRY BY-PRODUCTS

Casein Plastics

Casein, together with formaldehyde, was the basis of one of the first man-made plastics ever used. In spite of its comparatively low price, however, casein has not been able to compete with modern plastics, mainly for two reasons: the hardening of casein mouldings takes too much time, and their plasticity is too low. Attempts have been made to overcome these difficulties by using dispersions.

Skimmed milk represents casein in very fine dispersion which can be hardened within a very short time. Tests proved that dispersion-hardened casein can be obtained through precipitation from formalin-treated skimmed milk. By mixing skimmed milk with plastics dispersions and processing the mixture like casein, it was found possible to produce new types of plastics-cum-casein combinations. The attempt was also made to polymerise the disperse casein with urea-formaldehyde into a new type of plastics. The experiments had only limited success. It is still necessary to improve the technical properties of these new products which, if suitably improved, might be used economically as raw material for plastics, glues, insulating materials, etc.—M. E. Schulz and H. F. Hetzel, *Deutsche Molkerei Zeitung*, 1959, **80**, 668.

FERMENTATION

Control in Sago Factories

In the manufacture of sago globules from tapioca, microbiological contamination often occurs during the period of several hours in which the starch slurry is settling in open tanks. The genera most commonly found are *Oidium*, *Saccharomyces*, *Lactobacillus* and *Bacillus*.

Tests with various antiseptics have shown that 50 to 100 p.p.m. of SO_2 as gas or as K metabisulphite with HCl added after the first 12 to 24 hr., was the most successful method of suppressing microbiological growth for 48 to 72 hr. Prevention of spoilage for 72 hr. can be ensured by a second dose of 50 p.p.m. of SO_2 after 48 hr.—Y. S. Lewis and D. S. Jowar, *Food Sci., Mysore*, 1958, **7**, 285.

FISH

Quality Determination

A rapid physical test based on the refractive index of eye fluids has been developed as a criterion of the quality of fresh haddock. The results obtained were shown to be correlated with the organoleptic scores made on cooked flesh from the same fish and with the time of storage at refrigerator temperature above freezing.

Optical density tests on haddock eye fluids gave promising results but were not as suitable as were refractive index measurements for quality indication.

Enzyme action was thought to be the cause of changes in the physical properties of haddock eye fluids during storage at refrigerator temperatures above freezing since there was no evidence that bacterial composition was involved in such changes.—B. E. Proctor, J. T. R. Nicholson, *et al.*, *Food Technol.*, 1959, **13** (4), 225.

FLAVOUR

Evaluation Methods

The possibility of taste fatigue interfering with accurate flavour evaluation of citrus juices has long been recognised and various procedures have been tried to avoid the " taste saturation " effect of the essential oils present.

The work carried out consisted of a comparison of some of the methods commonly used to establish flavour differences among the 7 experimental variables of frozen concentrated orange juice. The results showed that using the complete latin square design for tasting 3 samples at a time did not improve the reproducibility of the results compared with tasting all 7 samples at one session.

The ranking method and the quality rating method gave results as accurate as those of the hedonic scale method. The results of all the tests were con-

sistent although it was found that some of the individual testers showed greater discrimination. Factors which are thought to be more important than the method of testing are discussed and an evaluation was also made of the influence of the temperature, room or refrigerated, on the panel judge's ability to differentiate between the variable constituents.—M. D. Tompkins and G. B. Pratt, *Food Technol.*, 1959, **13** (3), 149.

FREEZING

Poultry in U.S.

In the United States, the annual production of commercially frozen fresh poultry is of the order of 1,200 million lb. While this amount has remained fairly constant, the production of prepared and processed frozen poultry has considerably increased since 1955. Fresh poultry is generally frozen in an eviscerated condition.

In modern poultry plants, poultry is killed in continuous line operation. After bleeding, the birds are mostly scalded at 140°F., plucked in special machines arranged in series, singed, washed and eviscerated without previous cooling. Official inspection of the birds is becoming general practice. Cooling in an ice/water mixture has been found advantageous. It is recommended to keep poultry carcases cool for 12 hr. prior to freezing. To prevent desiccation during cold storage, poultry is generally packaged in foil made from polyvinylidene mix polymer in accordance with the Cryovac method. Freezing takes place in a stream of cold air, possibly after prefreezing in immersion baths containing a calcium chloride solution in order to improve the appearance. Freezing temperature is around −4°F. at which the poultry can be kept for about 10 months if it is to be sold in a satisfactory condition.—J. Gutschmidt, *Die Fleischwirtschaft*, 1959, **11**, 273.

MEAT PRODUCTS

Using Ascorbic Acid

According to tests carried out at the Institute for Food Hygiene at Budapest Veterinary College, it is possible to improve the colouring of cured and minced meat by adding ascorbic acid or sodium ascorbate.

In this case, and in the presence of an adequate quantity of nitrite, the development of the red curing colour is greatly accelerated during curing and smoking. It is also possible, in this way, to improve the taste of the product. The admixture of ascorbic acid need not exceed 0·05% of the quantity of meat. The use of ascorbic acid may also be advantageous in the case of sausages when the ascorbic acid may be added during final mixing. From a colouring point of view, however, it is preferable to add the ascorbic acid several hours earlier. A considerable percentage of the vitamins thus added can still be detected in the finished product.—J. Bosco, *Die Fleischwirtschaft*, 1959, **11**, 283.

MEAT IRRADIATION

Chicken Meat Changes

Chicken meat irradiation with 4-MeV and 2-MeV cathode rays at 50,000 rads had irradiation odours which were apparent, but irradiation flavours did not arise until the dose had reached 250,000 rads, a dose sufficient to extend the shelf life at 5°C. at least three-fold. At dose levels currently considered necessary for commercial sterilisation, 5,000,000 rads approximately, the taste panels rejected all irradiated samples as unacceptable.

The effect of a number of variables on reducing irradiation odours and flavours has been examined, including temperature during irradiation, oxygen content, method of cooking, age, breed, diet of the birds and storage after irradiation. Irradiation in a frozen condition at −75°C. was the most effective procedure examined. Approximately a threefold reduction in odour and flavour can be produced.—R. S. Hannan and H. J. Shepherd, *J. Sci. Food Agric.*, 1959, **10** (5), 286.

Destruction of Thiamine

In a study of the changes induced in food by ionising radiations, the destruction of thiamine in meat has been measured as one indication of chemical change. In both beef and pork, the destruction was found to be considerable but thiamine was chosen for study because of its extreme lability, so that measures taken to protect it could be more easily observed. Under a given set of conditions the breakdown was related to the irradiation dose.

Control of temperature was found to be the method of protection which gave the most striking results. The amount of thiamine destroyed is reduced when the samples were irradiated at temperatures below zero and, furthermore, the amount of breakdown decreased as the temperature at irradiation was decreased. The studies showed that considerable protection can be afforded by irradiation at −75°C.—G. M. Wilson, *J. Sci. Food Agric.*, 1959, **10** (5), 295.

TOMATOES

Commercial Flash Evaporation

Apparatus designed at the Western Regional Research Laboratory, Albany, California, was used to investigate the possibility of heat-treating tomato macerate. It was concluded from the studies that the process not only increased the quality and yields of paste but provided a substantial net evaporation.

Flash evaporation of finished juice as a step in paste or puree production was thought to be a practical process of low cost. Paste evaporation for runs of longer than a few hours, however, proved impractical with the present evaporators, particularly with paste from flash evaporated macerate.

Additional research is now being undertaken to improve general understanding of the process of the fouling in evaporator tubes during concentration of heat-sensitive materials.— A. I. Morgan, T. Wasserman *et al.*, *Food Technol.*, 1959, **13** (4), 232.

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

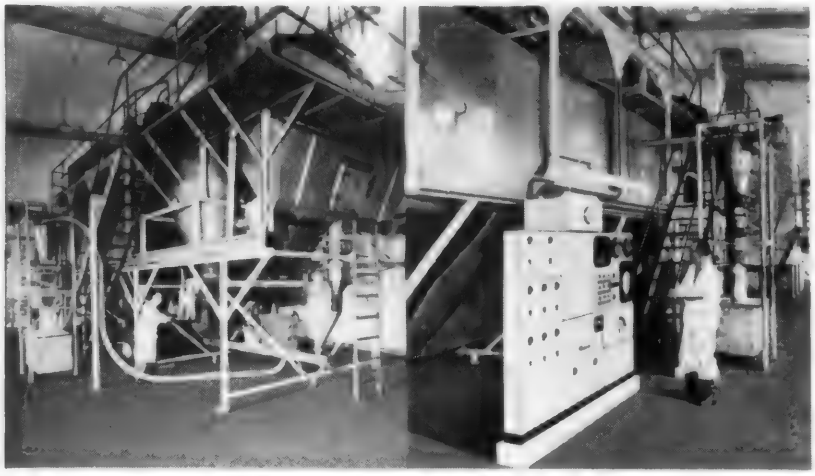
Take-over Bids

(*Concluded from page 357*)

pursuance of an arrangement which was part of the agreement for the transfer or which was made within one year before or two years after the offer, so long as the company or the bidder was privy to the arrangement. This prevents evasion by pretending to separate the payment of compensation from the arrangements for the transfer.

Furthermore, if a director is to retire and the price paid to him for his shares is in excess of the price paid to the other shareholders or any other valuable consideration is given to him, this is deemed to be compensation.

Machinery and Equipment



The new Blaw-Knox spray dryer installed by Trufood, Ltd., at their creamery at Wrenbury. (*Left*): An operator checking the motor which drives the transverse conveyor taking milk powder collected from one of the primary cyclones to the main chamber. (*Right*): The control panel from which the whole operation of the spray dryer is controlled by one operator.

SPRAY DRYING PLANT

Trufood, Ltd., have recently brought a new horizontal pressure jet spray dryer into operation at their creameries at Wrenbury, Ches. The first to be installed in this country by Blaw Knox Chemical Engineering Co., Ltd., this spray dryer is being used in the production of most of their range of infant foods. It is also being used for the drying of products associated with milk solids.

Spray drying is an essential part of Trufood's manufacturing process, particularly for their main product *Humanised Trufood*. During the manufacture of this product, cow's milk is split into its main constituents which are then recombined in similar proportions to human milk, embracing adjustment to the ratio of soluble and insoluble proteins.

The Blaw Knox spray dryer operates on the principle of forcing the milk under high pressure through a number of minute jets into an enclosed chamber which is maintained at a slight vacuum. The milk emerges as a multiple cone-shaped mist into heated filtered air and falls as a fine powder. It is fully dried by the time it has travelled 4-5 ft. through the chamber.

The powder is removed mechanically and continuously as it is formed so that it remains in the chamber for a maximum of only 5-10 min., and the temperature of the powder in the chamber is lower than with the equipment previously employed. The use of filtered air at room temperature to convey the powder in the last stages of its removal from the dryer, helps to cool it quickly so that it finally emerges at a temperature of only 80-90°F., instead of the former 150°F.

The continuous removal and cooling greatly reduces the risk of oxidation and of caramelisation of the powder. The rapid cooling also prevents any chance of even a slightly "cooked" taste and ensures that the flavour is retained.

To allow for the installation of the new plant it was necessary to raise the roof of the drying room by 12 ft. To avoid too great an interruption of production therefore, the new roof was constructed over the existing one which was then removed at the same time as the old plant.

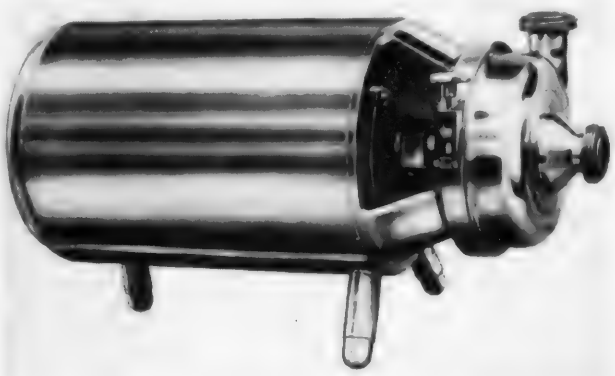
NEW RANGE OF PUMPS

The A.P.V. Co., Ltd., has introduced a new range of stainless steel pumps called the "PUMA," which is derived from "pumps with universal motor attachment," because an outstanding feature of their design is that a stainless steel stub shaft attachment allows them to take most of the appropriate standard types and makes of motors. With the previous range, special motors with stainless steel shafts were required. This feature, it is said, results in easy replacement in the event of motor breakdown and also quicker delivery, with economies in stocking and production. The new pumps are consequently lower in price. Embodied in this new range is provision for alternative and easily changed rotating seals for any conditions. Water cooling can be applied to any of these seals. The quick release provided makes it easy to dismantle the pump body and rotor for cleaning.

The pumps are made in 1½ in., 2 in. and 2½ in. sizes with various motor horse powers and with the various sizes and types of pipe connections used in the potable liquid industries here and overseas.

ROLLER CONVEYOR

Manufacturers Equipment, Ltd., have produced a new live roller conveyor, the *Rapistan* LR, which it is claimed, allows sweep-off, accumulation, or stopping of items for inspection, wrapping, weighing, labelling, etc., without stopping the conveyor.



An outstanding feature of the new PUMA range of stainless steel pumps made by the A.P.V. Co., Ltd., is their ability to take most of the standard types and makes of motors.

The carrier rollers of the conveyor ride on top of the drive belt and are of smooth-surfaced steel which reduces frictional resistance when stopping or sweeping off material. The pressure rollers below the drive belt are spaced so that there is one pressure roller between each two carrier rollers. The pressure rollers, which are mounted through an elevated hole in the frame into an adjustable angle plate, may be raised or lowered to get the desired belt pressure against the carrier rollers for efficient operation.

ULTRASONIC HOMOGENISER

Ultrasonics, Ltd., say that their latest model of the *Minisonic* homogeniser fulfils the need for a reasonably priced and small versatile machine.

Ultrasonics, Ltd., say that the *Minisonic* model 3 is the result of teamwork: the technical service manager, Mr. John S. Smith, has supplied detailed information about the many installations of the liquid whistle with which he has been closely associated; the Company's new chief engineer, Mr. Brian B. Fordham, A.M.I.MECH.E., has contributed great ingenuity by incorporating so many new features and the consultant designer, Mr. Thomas Wolsey, M.S.I.A., has helped to give the machine its appearance.

The machine may be used in the laboratory to make small quantities of emulsions (up to 3 litres at one time without premixing), for homogenising small batches of emulsions and as a pilot plant homogeniser. The principle on which the machine works is that of the liquid whistle covered by British Patent No. 695491.

The machine is constructed so that all parts in contact with the liquid to be sonified are made in 18/8 stainless steel and corrosion resistant materials. The machine is supplied with built-in glass vessels, and a three-way control valve, and is ready for plugging into a 15 amp. 3 pin socket.

The Minisonic model 3 made by Ultrasonics, Ltd., is intended for laboratory and small quantity homogenisation.

FREEZING

The G. Williams Engineering Co., Ltd., are now offering contact plate freezer units with a new freezing plate. Freezing times of 3 and 1 hr. are claimed for 4 in. and 2 in. thick blocks of whole fish respectively, which are almost 100% better than freezing times obtained with conventional plates in current use. When used for ice cream hardening, 1 pint cartons of ice cream were hardened to a temperature in the centre of $-5°$F. in 30 min.

Nearly all of the surface of the new plate is in contact with the refrigerant passing through the plate. A much higher rate of heat transfer is claimed. The internal construction provides for a progressively increasing flow area as the refrigerant absorbs heat and increases in volume during its passage through the plate.

This Brimpex hydraulic stacker is claimed to lift 60 tons per hr. for 8d. worth of odourless propane gas.

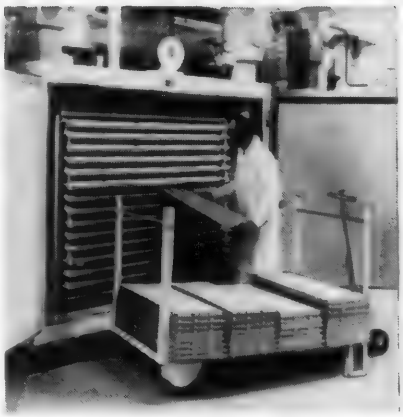
STACKER

The Industrial Machine and Equipment Co. (Brimpex) Ltd., have introduced a propane gas fuel stacker as a further addition to their range of hydraulic lifting machines.

The hand-propelled propane gas operated stacker is operated without flex or batteries, whilst the efficiency of the gas engine is said to achieve a practically complete combustion which eliminates obnoxious fumes completely. The stackers can, therefore, be used indoors even in industries where, it was not possible to use internal combustion engines.

The makers say that the machine has lifted 60 tons in an hour at a cost of approximately 8d. A considerable saving in gas consumption has been achieved by linking the operating lever for the lifting movement to the throttle of the engine. The throttle is now only opened during the actual lifting performance of the machine and reverts to "tick over" during lowering and waiting. The 10 lb. *Bottogas* containers are exchangeable, the refills costing 6s. 8d.

The lifting capacity of *Brimpex* stackers is up to 7 cwt. at a rate of 40 ft. per min., and 5 ft. and 7 ft. high lifting stackers are available for early deliveries.



The contact plate freezer made by G. Williams Engineering Co., Ltd.

LABORATORY MILLS

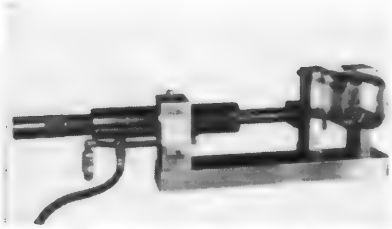
Two mills intended for use in the laboratory have been introduced by Glencreston, Ltd.

One is the *Micro mixer mill* for extremely rapid disintegration and mixing of minute quantities of substances to ultra-fine particle size. The grinding and mixing is carried out in stoppered vials of 2 or 5 c.c. capacity, made of plastic, stainless steel, hardened tool steel or agate. The size of the vials and the fact that they are completely closed during operation ensures that even the smallest quantities can be ground and mixed without any losses and there is no risk of contamination. The large choice of vials of different materials is of particular value where even microscopically small traces of abraded contaminants from the grinding tools have to be considered.

The grinding speed is said to be fast: materials can be pulverised to less than 200 mesh in 2-3 min.

The mill is described as an extremely useful analytical and research tool, with applications in food investigation, etc.

The other piece of equipment is the *Sample mixer mill* which basically serves the same purpose, but is capable of coping with very much larger quantities.



The new Tite-Wrap machine for high-speed packing with Viskase, Ltd.'s new vinyl-type plastic film, Visten.

PACKAGING MACHINE

Viskase, Ltd., have introduced a new machine for producing products wrapped in their new vinyl-type plastic film, *Visten*. The machine, which is known as the *Tite-Wrap*, is operated by compressed air and the film is wrapped over expanding fingers when these are in a closed position. When the foot pedal, connected to the air pump, is depressed the piston is forced across, expanding the fingers which stretch and open the wrap. The pedal is held while the food is inserted in the bag through the open fingers, and is released as the filled pack is removed for sealing.

The makers say that the machine can pack any product from a 4 oz. sausage chunk to a 24 lb. ham.

ROTARY AIR COMPRESSOR

B.E.N. Patents, Ltd., have added a rotary air compresser and exhauster for applications requiring clean oil-free air at low pressure, suitable for use in the dairy, food products and brewing industries, to their range.

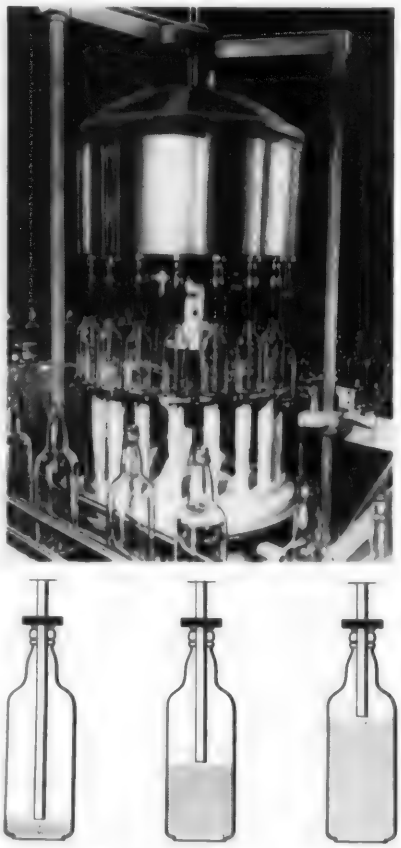
The model KIC rotary compressor has a stator cast from non-rusting nickel cast-iron alloy and incorporating standard inlet and outlet radial ports. It is well finned for cooling, assisted by a fan mounted on the coupling. The rotor is of alloy steel, slotted throughout its length to take carbon blades free to move radially in the slots. These blades of a carbon composition are said to have a very low co-efficient of friction and run dry for long periods without attention. They are easily replaced if necessary.

The shaft runs in grease-packed ball bearings requiring no external lubrication. A part of the stator base is machined to the same diameter as the rotor to provide a wide seal between the suction and delivery sides ensuring that these are always separated by at least two blades. This is claimed to reduce internal leakage to a minimum giving high volumetric efficiency, lower horse-power and minimum delivery temperature.

The drive is effected by direct coupling to a ¾ h.p. electric motor providing a compact unit, at low cost, with a displacement of 10 c.f.m. and suitable for vacua up to 20 Hg.

NEW FILLER

One of the problems of filling where highly foamy products are concerned is to obtain a correct "fill." Employment of the conventional "top" filling arrangement must be slow if formation of foam is to be avoided. In the case of viscous liquids too, filling must be slow if air bubbles are not to be trapped in the product and thus also, give a false height. The new Horix Gravity-Vacuum Filler supplied by Farrow and Jackson, Ltd., is believed to overcome both these difficulties.



(Top): **The new Horix gravity-vacuum filler, claimed to overcome the problem of filling foamy liquids.** *(Bottom):* **A diagram of the filling action; the filling tube drops to the bottom of the container at the start of the fill and withdraws gradually so that entering liquid is always below the surface.**

The filling tube rises with the level of the liquid, "fill" height being easily achieved since only the tip of the filling tube extends below the surface of the liquid being filled, thus, speed of operation can be at its maximum. The actual method of operation is for the filling tube to drop to the bottom of the container at the start of the filling cycle, and then to withdraw gradually, keeping just beneath the surface of the rising liquids. This withdrawal is controlled by a cam track mounted inside the filling tank above the liquid level. Wheels mounted on the tube, ride on this track and lift the tube.

The track slopes at a sharp angle for the initial descent of the tube into the container. A short level portion of the track then keeps the tube "bottomed" while the surface level of the liquid rises above the tip of the filling tube. Then a gradual rise in cam track brings the tube up, just beneath the surface level of the product.

ELEVATOR

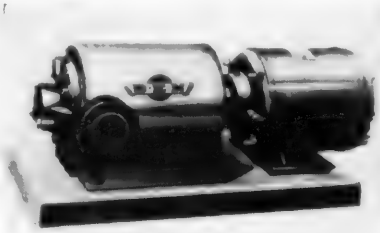
The Hodgkinson Group of Companies have announced that Bennis Combustion, Ltd., are manufacturing the new 8 in. universal elevator for boilerhouse applications.

It is of the familiar chain and bucket type, designed to handle the usual boilerhouse fuels at rates up to 1½ tons per hr. Standardisation is believed to have resulted in many advantages not possessed by other types of elevators, not the least being low installation and maintenance costs. The makers say that any length of elevator, for any inclination of between 60° and vertical, can be built up from a series of standard components, bolted together, and lifted into position in a matter of hours.

There are five basic units—the feeding mechanism, the boot, lower section mid-section and the head which incorporates the drive. The standard mid-sections are approximately 8 ft. in length, but smaller sizes are available so that any particular length of elevator can be built up. Also a special curved mid-section can be supplied where site conditions make a vertical elevator necessary.

A new type of feeding mechanism is incorporated which cannot be jammed by extraneous matter since there is neither ram nor paddle, simply a flat oscillating plate.

The body is hinge mounted at the base and head so a high degree of accuracy at the floor of the pit is not necessary and small adjustments to the slope of the elevator can be made easily during erection.



The new B.E.N. KIC rotary air compressor and exhauster has a maximum working pressure of 10 p.s.i., and is intended for use where clean oil-free air is required.

News Digest

Sugar Confectionery Manufacturers meet in Lyons

The Technical Committee of the International Association of Sugar Confectionery Manufacturers held its fifth session at Lyons-Charbonnier in France from May 4 to May 6, under the presidency of Mr. C. L. Hinton.

This committee was inaugurated in April, 1955, at the time of the International Association's General Assembly in Amsterdam, when Mr. Hinton of the British Food Manufacturing Industries Research Association was elected chairman of the Technical Committee and its functions enumerated. Principal among these was the study of the methods of analysis of the raw materials and finished products of the sugar confectionery industry, with the view to establishing official methods for the trade. It was felt that the prior existence of methods of analysis at international level could prove of value in any arbitration involving suppliers and users in different countries, and this consideration would become far more relevant if the Sugar Confectionery Industry's goods became involved in the European Free Trade Area scheme. Further it was considered of great value to create opportunities for the confectionery scientists of different countries to meet and exchange views.

Full sessions of the committee had been held in Paris in 1955 and in Wiesbaden in 1957, and informal meetings had been held during the General Assemblies of the International Association in Rome in 1956 and in Brussels in 1958. At the meeting at Lyons, the British delegation was as follows:

Dr. A. A. Houghton of Mars, Ltd.
Mr. A. Sansome of Edward Sharps, Ltd.
Mr. E. Steiner of the British Food Manufacturing Industries Research Association.
Mr. D. R. Felstead of Barratt and Co.

Delegations also came from Germany, Belgium, Italy and France. Also present at the conference were Col. A. B. Walters and Mr. J. E. Chapman, representing the Cocoa, Chocolate and Confectionery Alliance, M. Jean Vialla, the Director of the International Association and M. Jean Herbet, the Founder President, who opened the proceedings.

The conference was concerned with the continuation of the study of analytical methods and in assessing the practical laboratory work done on these methods since the last meeting. Since its inception the committee has found a large measure of agreement on the methods selected, but where agreement has not been readily reached the various delegations have undertaken a programme of practical work designed to form the basis for a critical comparison of available methods. For example, a great deal of work of this kind has been done by the delegations on such subjects as the determination of moisture in high boilings, caramels and liquid glucose, using the method of Karl Fischer and by vacuum drying, the determination of fat, the estimation of butter fat and the gelling power of agar agar.

At the conclusion of the session it was agreed that sufficient progress had been made to justify proceeding with publication of the volume containing details of the methods adopted, both officially and tentatively. It was agreed to publish this in the form of a loose leaf manual which would be ideally suited to take additions or modifications.

Mr. C. Hinton, who recently retired from his post of Superintendent of Research at the British Food Manufacturing Industries Research Association at Leatherhead, resigned from his chairmanship of the Technical Committee at the conclusion of the session. Dr. A. A. Houghton of Mars, Ltd., was unanimously elected to succeed him. Tribute was paid to Mr. Hinton by M. Vollaire Salva, head of the Laboratories of the French Association, for the work he had done in initiating the work of the committee and in bringing it to the fruitful stage of publication in so short a period.

Delegates of the International Association of Sugar Confectionery Manufacturers at Lyons, France, where the Technical Committee recently held its fifth session.

Corrosion Exhibition moves to Olympia in 1960

The biggest step yet in the history of the Corrosion Exhibition will be taken with next year's show. From the Royal Horticultural Hall it is being promoted to Olympia where the whole of the Empire Hall has been booked. This means that the 1960 Corrosion Exhibition will be twice as big as the 1959 show, held last April. Stands will be bigger and there will be more and better facilities for visitors.

The Exhibition will be open from Tuesday, November 20, to Friday, December 2. A complete range of anti-corrosion materials, methods and equipment will once again help industry to fight the menace that costs Britain £600 million a year.

The Corrosion Exhibition is organised by *Corrosion Technology*, a Leonard Hill journal. Bookings are now being accepted and full information is available from The Organiser, Corrosion Exhibition, Leonard Hill House, Eden Street, London, N.W.1.

Reorganisation

Certain of the Shell Chemical Co.'s operations have been integrated into three divisions corresponding to the three main fields in which it is engaged: industrial chemicals, agriculture and plastics.

OBITER DICTA

● This is the best darn food you ever thaw.—*U.S. advert. for frozen food.*

● Her Royal Highness . . . will visit a farm and a tomato vinery. —*Programme of Princess Margaret's visit to Guernsey.*

● The Englishman is becoming more and more an adventurous eater. I now sell 300 snails and 40 pairs of frogs' legs a day.—*Soho restaurateur, Alex Gaudin.*

● In a new bid to make sherry attractive to Americans, British shippers will ask them to try it "on the rocks." Sherry, in other words, with ice.—*Evening News.*

● Within a year or so the housewife in Britain may expect to go shopping and return with a year's supply of food in her basket.—*O. D. Godfrey in Australian Food Manufacture.*

● Coffee tasting requires keen sight, a sensitive nose and a discriminating palate. For this reason no coffee taster would smoke, or invite a woman wearing scent into his tasting-room.—*Press handout.*

● Peter Simple's story of the rhinoceros that expired after eating the contents of a British Railways packed lunch has caused considerable concern to British Transport Catering Services and their suppliers.—*Letter in Daily Telegraph.*

● As a nation we have suffered too long from a reputation for boiled cabbage and soggy potatoes. But we have always had a reputation for producing magnificent raw materials.—*Rt. Hon. John Hare, Minister of Agriculture, Fisheries and Food.*

● Believing that the world's most tired adjectives are those used in beer advertising, the G. Heileman Brewing Co., La Crosse, Wis., has made up its own language to describe its Old Style beer. VIVITY . . . QUENST . . . BRUSTY . . . THRING . . . are some of the one-word headlines to be used in $1,500,000 campaign this summer.—*The Brewers Digest.*

● And do not neglect the speciality of this coast: sea urchins. Within a black round shell bristling with sharp spikes, you find a pinkish-grey gelatinous mass. Scoop this out; it has a pronounced aroma, and tastes like a mixture of raspberry, iodine, and bromine. Unbelievably delicious!—*South American Report.*

Thawing of frozen fish

The industrial thawing of frozen fish, which normally takes up to 24 hr. in air can now be done in about 15 min. by dielectric heating. This new development, which solves a major problem of the fish industry, is the result of work at the Torry Research Station of the D.S.I.R. A patent application has been made for the method which is of great economic significance in the quick frozen food industry, and may have wider application.

The method, known as dielectric thawing, depends on the fact that if any material is placed between, but without touching, two metal plates which are charged with an alternating voltage of many thousands of volts at a frequency of about 40 million cycles per second, energy is produced in the material in the form of heat. Under well defined conditions, fish may be uniformly thawed throughout a block of the frozen material—either as whole fish, as in the case of herrings, or as fillets. It is possible to control conditions far more accurately than in existing methods, for example, so that individual fish in a block may be separated while remaining partially frozen.

Laboratory-scale experiments at the Torry Research Station, Aberdeen, had shown that it was possible to use dielectric heating successfully on tiny pieces of frozen fish. Pilot scale apparatus, using slightly modified equipment which is commercially available, was therefore set up. The problem of "runaway heating" in which small portions of blocks of fish absorbed the major part of the available energy and became cooked, while the rest of the block remained hard frozen had to be overcome, but now the fish may be fed into the machine on an endless belt and thawed in 15 min.

At present fish is thawed by laying it out in the air; it is sometimes, in addition, sprayed with water. Under these conditions, fish on the outside of a block thaws quickly and begins to deteriorate, while that in the middle remains frozen. The new method requires no handling during thawing, is quick and therefore keeps deterioration to a minimum, and the equipment does not take up much floor space.

The capital cost, about £10,000 for equipment to thaw 1 ton of fish per hr., is said to be comparable to that for freezing equipment of similar capacity. Running and depreciation costs appear to compare favourably with the costs of existing methods of thawing.

Instrument agents

The recently formed Analytical Instruments Department of Southern Instruments, Ltd., have appointed A. R. Bolton and Co., of Edinburgh, as their sole distributors for Scotland.

Services for frozen foods industry

E. S. and A. Robinson, Ltd., and associated companies are serving Grimsby industries from a new office. This move results from demand for closer liaison with the frozen foods industry in the area, which handles large quantities of vegetables as well as fish products.

The new office, at 53 Hainton Avenue, (Telephone: 58034-5), will mean more flexible supply by the week or day from customers' stocks to meet the rapidly fluctuating demands of Grimsby industries. Closer liaison on all aspects of packaging on the technical and design side will also result. Member firms of the Robinson Group, including the Robinson Waxed Paper Co., Ltd., Paper Sacks, and New Merton Board Mills, will be in close touch through the new Grimsby headquarters.

Northern Cold Storage Ltd., has announced the opening of a new single-storey cold store, suitable for all kinds of frozen foodstuffs, in Ladysmith Road, Grimsby. It is well outside the fishing dock-area, yet only 10-15 min. from the quayside

The total storage space is 1·1 million cu. ft., divided into two large rooms of equal capacity. The store temperature is as low as −20°F., and quick freezing facilities of the most modern design are also available to customers.

The single-storey building is designed for use with modern devices for mechanical handling: fork lift trucks and pedestrian fork lifts are used throughout, all capable of lifting loads up to two tons.

This arrangement makes it possible to unload, for instance, British Railways' new palletised insulated containers, with a capacity of 4 tons, in about five min.

The new store has a large yard area, and a covered loading bank that will accommodate a total of 20 fifteen ton lorries.

Among the customers that have already made use of the store's facilities are Adam's Wholesale Dairies, Ltd., Birds Eye Foods, Ltd., Findus, Ltd., and Mac Fisheries, Ltd.

Condensed milk regulations

The Ministry of Agriculture, Fisheries and Food, has made jointly with the Minister of Health, the Condensed Milk Regulations, 1959, which amend the Public Health (Condensed Milk) Regulations, 1923 to 1953. Provision is made for the sale of sweetened and unsweetened partly skimmed (half cream) condensed milk, and require it to be labelled "should not be used for babies except on medical advice."

The requirements of subsection 3 of section 109 of the Food and Drugs Act, 1955, will not apply in the case of an offence against any labelling or marking provisions of the regulations.

Packaging division

The Reed Paper Group have regrouped several of their companies to form the Reed Packaging Division, strengthening their packaging service.

The companies brought together by this grouping are: Reed Corrugated Cases, Ltd., who make corrugated and solid fibreboard cases; Medway Paper Sacks, Ltd., who, in addition to making sacks and liners, produce sack filling and handling equipment; Cut-Outs (Cartons) Ltd.; Cropper and Co., Ltd.; Paper Converters, Ltd.; and R. H. Filmer, Ltd.

The division will be under the direction of Mr. F. J. Clark, a director of Albert E. Reed and Co., Ltd.

Highland herring cannery plans

A Glasgow firm's tentative plans to set up a herring cannery in Gairloch, Wester Ross, are being explored by a three-man committee of Ross and Cromarty County Council. They are hoping to meet representatives of the Clydehill Tool Co., of Glasgow, and hope to have details of the scheme soon.

A spokesman for Clydehill said that the scheme was in the embryonic stage and that no company had yet been formed. The idea was a good one, he said, but depended on getting premises and Government support. The company has asked the county council if it would be prepared to erect permanent factory premises and lease them as a factory at an economic rent. The estimated cost of a factory is £3,000.

Local authorities have powers under the Town and Country Planning (Scotland) Act, 1947, to provide factories along these lines and Ross and Cromarty County Council have already done so.

Whisky waste for animals

An example of the convertion of material previously wasted, into a useful by-product can be seen on the D.S.I.R. stand at the Scottish Industries Exhibition, where Scottish Malt Distillers, Ltd., are showing a sample of a new animal food which has been produced entirely from the residues of malt whisky distillation.

The new product, known as Malt Distillers Dried Solubles (or Malt D.D.S. in brief), is said to have a high protein value and vitamin B content. It is stated that farm experiments and laboratory tests with poultry have already proved its success, and its greatest value is likely to be as an inexpensive source of "growth factors," essential to improving the health and size of table poultry and pigs. Production will be at the rate of 100 ton per week by the end of the year.

Until recently, pot ale or spent wash in the Scottish malt whisky industry was either put to waste or evaporated and sold as a fertiliser.

Air Lift for Soft Drink Compounds

The largest air consignment ever of soft drink compounds recently left Blackbushe Airport for Kuwait in a DC.6C chartered from Eagle Airways. Manufactured by W. J. Bush and Co., Ltd., at their Tottenham, London, factory, the consignment comprised 11 tons of concentrated orange compounds. This picture shows the casks of concentrate being loaded on to the aircraft, while from left to right in the foreground are: Messrs. Georges Florentin (an Export Manager, Bush's), G. W. Moore (Shipping Manager, Bush's), J. H. Barrett (Manager of Bush's Tottenham factory), E. A. F. Bolton (Administration Manager, Bush's), J. W. Wild (Director, H. Clarkson Air and Shipping Services, Ltd.), C. J. Woodhatch (Air Shipping Agencies, Ltd.), W. D. Garton and F. Moss (Bush's Transport Department).

Forthcoming Events

Society of Chemical Industry

October 1-2. Symposium: "Enzymes in the manufacture, storage and distribution of food." To be held at the Royal Society of Medicine, 1, Wimpole Street, London, W.1. October 1—9 a.m.-5.30 p.m. and October 2—9.15 a.m.-4.30 p.m.

Concentrated apple juice

A new concentrated apple juice called *Dapple*, produced by the newly-developed vacuum freezing-drying techniques, is being manufactured by C. Robinson and Co.

A spokesman for the company said that the juice was highly concentrated, and contained more vitamin C per fl. oz. than any other pure fruit juice concentrate on the market.

Changes of address

Arenco, Ltd., have moved to: Pixmore Avenue, Letchworth, Herts. Tel.: Letchworth 965. Telegrams: Arencomek, Letchworth.

The new address of the National College of Food Technology is: St. George's Avenue, Weybridge, Surrey. Tel.: Weybridge 3991.

The head office of Regent Foods, Ltd., is now at: 112, City Road, London, E.C.1. Tel.: Clerkenwell 0552.

News for importers

Polish butter quota: A special increase of 5,000 tons has been made in the quota for the import of butter from Poland in 1959. Poland has agreed to purchase increased quantities of U.K. capital and consumer goods to an equivalent value.

Restrictions on import of dollar area butter: The Board of Trade has removed restrictions on the import of butter from the dollar area. The Open General Licence has been amended accordingly.

Tartaric acid.—The Board of Trade have given notice that they are considering an application for the imposition under the Customs Duties (Dumping and Subsidies) Act, 1957, of anti-dumping duties on tartaric acid imported from Italy, Spain and Western Germany.

Fresh pear imports.—The Board of Trade have announced that the quotas for the import of fresh pears from Western European and certain other countries and from the Dollar Area have been amalgamated to form a single quota, *i.e.*, 480,000 cwt., and licences will be issued to cover the period July 1, 1959 to June 30, 1960.

Mr. A. M. Lewis

Mr. J. L. Watkinson

Mr. J. Bennett

Mr. W. S. H. Betts

Mr. J. F. B. Blatch

Mr. R. F. A. Crane

PEOPLE

MR. ARTHUR MAXWELL LEWIS, M.A., B.SC., has joined the staff of Reads, Ltd., as general sales manager. Previously he was general manager of Harlequin Press (1955), Ltd., a subsidiary company in the George Newnes Publishing Group.

Mr. Maxwell Lewis is a member of the Society of Automotive Engineers, the Advertising Association and the Incorporated Sales Managers' Association.

*

MR. JOHN F. B. BLATCH has been appointed secretary to Mac Fisheries, Ltd. He was educated at Bradfield and University College, London.

In 1949 Mr. Blatch was appointed secretary to Poultrim, Ltd., a company concerned with importing poultry. Since 1957 he has been secretary to Britfish, Ltd., a company handling exports of fish to Russia.

*

LORD NETHERTHORPE who has been president of the National Farmers' Union for the past 14 years will not seek re-election when his present year of office expires next January.

As Mr. James Turner he was first elected president in 1945.

*

SIR AMBROSE KEEVIL has been appointed chairman of Fitch Lovell, Ltd., with MR. NORMAN F. LAMBOURNE and SIR ROLANDE WALL as vice-chairmen. Due to the increase in his other commitments SIR GRAHAM ROWLANDSON has resigned from the board.

*

At the Annual Meeting of the Society for Applied Bacteriology, held in London on July 8, the following were among those confirmed in office: hon. president, MR. D. A. MCKENZIE; hon. treasurer, MR. G. ELIS JONES; hon. editors, DR. S. E. JACOBS and DR. C. A. E. BRIGGS.

After 8 years as hon. secretary, MR. G. SYKES announced his resignation. His place will be taken by DR. ELLA M. BARNES, D.PHIL., DIP.BACT. This change will take place towards the end of October.

MR. JULIAN T. CAMPBELL is retiring from Betts and Co., Ltd., on September 30. He joined the company in 1913 and has been in charge of sales since 1932.

MR. WILLIAM S. H. BETTS will become director in charge of sales as from October 1 and MR. RUSSELL W. SMITH has been appointed an assistant sales manager. MR. H. OFFER will become sales office manager for capsules, including foil, and MR. R. G. ROWSON will become sales office manager for tubes.

MR. J. TIPPING, has joined the sales force as a representative.

*

MR. STEWART COLE has been appointed chairman of Eskimo Foods, Ltd., in the place of the late Mr. W. A. Bennett. The position of managing director will be filled by MR. JOHN BENNETT, J.P., managing director of Northern Trawlers, Ltd. The managing director of Eskimo Foods, Ltd., MR. J. G. SPROTT was appointed to the board.

*

DR. W. G. SENIOR, C.B.E., Chief Dental Officer, Ministry of Health, has been appointed as Chairman-Elect of the Royal Society of Health's Council. He will assume office on October 1, 1959.

*

MR. JOHN KIRWAN-TAYLOR, who joined the board of UNIGATE, LTD., at the time of the merger between United Dairies, Ltd., and Cow and Gate, Ltd., has now joined the board of Cow and Gate, Ltd.

*

MR. R. GROVES, M.A., B.SC.(OXON.), F.R.I.C., has accepted an invitation from the Minister of Agriculture, Fisheries and Food to serve as chairman of the Food Standards Committee for the next three years.

Welcoming the appointment of an independent chairman of the Food Standards Committee, the Food Manufacturers' Federation stated that the selection of Mr. Groves would do much to smooth the way toward better working between the industry and the committee.

MR. R. F. A. CRANE, formerly provincial sales manager of Bowater-Eburite Fibre Containers, has been appointed sales manager of the Autolex Division of Bowater-Eburite Flexible Packaging. He has been with the organisation for 25 years and will operate from the Autolex headquarters at Sunbury-on-Thames.

MR. J. L. WATKINSON has been appointed sales manager of the Packaging Papers Division, Bowater-Eburite Flexible Packaging, Ltd., and is now responsible for the sale of film and paper bags as well as packaging papers.

Mr. Watkinson started Bowater sales in the waxed paper field in 1950 and was previously manager of the packaging papers department of Bowaters Sales Co.

*

H. IREDALE NELSON, M.A., has been appointed advertising manager of Diversey (U.K.), Ltd., and Deosan, Ltd. He was formerly publicity manager of the Sheepbridge Engineering Group. He will be responsible for handling all publicity for the range of Diversey and Deosan cleansing and sterilising products.

*

DR. D. A. SUTTON, PH.D.(LOND.), B.SC., A.R.C.S., has been appointed director of research of the British Gelatine and Glue Research Association. He is expected to take up his appointment towards the end of October. He succeeds Mr. A. G. Ward, O.B.E., M.A., F.INST.P., who was director of research from the formation of the association in 1948 to the end of August.

*

Obituary

The death occurred in London on August 4 of MR. GEORGE H. WATTS, who was financial director of the Express Dairy Co. (London), Ltd. He was previously secretary to the company and was with the group for 41 years.

*

The death occurred on August 23 of MR. LEONARD MAGGS, chairman of Unigate, Ltd. He was chairman and managing director of United Dairies, Ltd., for 17 years prior to the formation of Unigate, Ltd.

Food in Parliament

A plan for the setting up of a meat research centre is under examination. M.P.'s were told that the project was under "active consideration" by the Agricultural Research Council, but it might be some time before a decision was reached on it.

Meanwhile, there is a scheme to establish a small laboratory near Cambridge, where the meat research work now carried on at the Low Temperature Research Station can be expanded.

Experimental work of a different kind has been conducted at Torry Research Station, Aberdeen, during the last three years. Here the scientists have been working on various designs of fish freezers for use in fishing trawlers. The results of their labours may be the provision of more and cheaper fish of higher average quality.

The story began in 1956 when full-scale commercial experiments on the distant water trawler *Northern Wave*, proved the technical feasibility of freezing the first part of the catch, and the suitability of the vertical plate freezer specially designed by the Torry Research Station. The experiments also afforded considerable information on the vital angle of costs. Subsequent work has improved the freezer and led to the design of a part-freezing trawler.

Now the research station staff are advising interested trawler owners and manufacturers, about the layout of the new vessel carrying this special freezing equipment and cold storage facilities.

Steps were taken in Parliament recently to allay any public anxiety which exists about the amount of strontium in wholemeal bread. Scientific pronouncements on the subject had given rise to public misconceptions as to the continuing value of this bread, it was suggested.

M.P.'s were told that there was no ground for anxiety. The effect of substituting wholemeal bread for white bread in an otherwise average diet, was to raise the ratio of strontium 90 to calcium in the total diet approximately from six to nine strontium units. This higher figure is a long way from the level causing concern about human life.

Last year there were 48 outbreaks of food poisoning in hospitals.

Fifteen were traced to meats or meat products, two to cheese, and in eight cases the food responsible was not known. Salmonellae organisms were responsible in the other 23 outbreaks, but the causal food was only identified in one.

Mr. Hare, the Agriculture Minister, has discounted fears expressed by one M.P. that the fall in British sow production constitutes "a danger to the bacon, pork, sausage, and pie trades," imperilling British employment and production, and opening the door to foreign competition adverse to these home food industries.

Erections and Extensions

Bentley Bakeries, Ltd., are extending their bakery in Smeaton Street, Middlesbrough, Yorks.

■

Fentimans Direct Supply Co., Ltd., are having a mineral water factory erected on a site at Lower Gosford Street, Middlesbrough, Yorks.

■

British Bakeries, Ltd., are having a bakery and distribution depot built on a site at Brent Road, Southall, Middlesex. These new premises will eventually employ 530 workers.

Standard Bottle Co., Ltd., are having extensions built to their factory in Bounds Green Road, London, N.11.

■

Neilson's, Ltd., ice cream manufacturers, have opened a newly-constructed branch depot for ice cream and frozen foods at Llantarnam Road, Cwmbran, South Wales.

■

Eskimo Foods, Ltd., 190-196, Ilderton Road, London, S.E.15, have opened a newly-constructed frozen food depot at Camden Town, London, N.W.1.

Approved chemical agents

In accordance with Regulation 27 (6) (*a*) of the Milk and Dairies (General) Regulations, 1959, the Minister of Agriculture, Fisheries and Food, and the Minister of Health have approved of the following products for the cleansing of milk tankers, vessels or appliances as an alternative to scalding with boiling water or steam: *Kinray Hypochlorite* (agricultural grade), and *Cheshire Detergent Steriliser* made by the Reddish Chemical Co., Ltd., and *Stericlens* made by Bell and Sons, Ltd.

Luncheon meat code

Discussions have recently taken place between the Food Manufacturers' Federation, Inc., and the Association of Public Analysts on the question of the meat content of luncheon meats. Arising from these discussions a Code of Practice has now been agreed to come into operation as from October 1, 1959. This provides for a minimum meat content of 80% in all luncheon meats.

Discussions on the question of other canned meat lines are proceeding between the two bodies.

Beecham group sales up

The total sales for the Beecham Group, Ltd., for the year ended March 31, 1959, rose by £6,225,098 to £40,407,914. Home profits rose by £697,831, and included £399,175 from Thomas and Evans, Ltd., for the 7 months following upon their acquisition.

A final dividend of 14%, making a total of 24% for the year was approved.

Butterfields' profits down

The profit before providing for taxation for the year ended March 31, 1959, for W. P. Butterfield, Ltd., fell from £173,635 in the year before to £99,190. In his annual report the chairman, Mr. C. Butterfield, stated that while the turnover had almost been maintained the profit margin had dropped, accounting for the decline.

The net profit amounted to £53,490 (£82,135), and a final dividend of 6%, less tax, for the year, was approved.

"600" profits down

The combined profits of the George Cohen 600 Group, Ltd., before taxation amounted to £1,308,109 for the year ended March 31, 1959, compared with £1,813,815 for the previous year.

Increased yeast exports

The annual report of the Distillers Co., Ltd., states that the home sales of yeast during the year ended March 31, 1959, were satisfactory: the downward trend of the past few years appeared to have given way to a degree of stabilisation. Referring to exports, the prospects were described as extremely encouraging for there had been a substantial increase, particularly of dried yeast.

Food News Overseas

Norwegian fish plant capacity

Plans have been prepared for doubling the capacity of the Findus frozen fish plant at Hammerfest in North Norway. If the plans are carried out, the number of workers will have to be increased from 600 to 1,000 or 1,100.

Canned banana

A wide demand is expected for a new Dominican Republic banana product, canned fresh mashed banana. It is stated that the product can be stored for more than a year at room temperature with no loss of freshness or quality.

The factory in the Dominican Republic began production last October with a capacity of 3 million lb. This has been raised to 5 m. lb. and it is intended to extend production to a total of 15 m. lb.

"Palatable" dehydrated bananas

Mr. H. Lowenstein, a South African industrial chemist, has invented a technique for dehydrating bananas that promises to take up all the "slack" in banana supplies by converting them into a highly palatable dried food for both the South African and overseas markets. The banana co-operative at White River, in the Transvaal, has taken a half share in the company formed recently to manufacture and market the product.

The dehydrated banana is a light yellow, crisp, flaky substance, easily digestible and with an agreeable flavour, proposed to be sold in packets as a sweetmeat, which can also be used as a porridge since it is soluble in milk.

Australian radiation research

A combined research programme into the use of radiation to kill bacteria in food is being conducted by the Australian Atomic Energy Commission, and the Scientific and Industrial Research Organisation, while the Australian Army will also contribute experts.

Among the problems to be investigated is the effect of radiation on the fruit-fly infestation of fruit, and whether radiation will effect the texture of fruit. Scientists say that the work on fruit-fly infestation is so promising, that it may succeed in restoring Australia's export earnings on citrus fruits. The programme will be undertaken in a special section of the A.E.C.'s research centre at Lucas Heights, Sydney.

Venezuelan flour mill

A flour mill, Grandes Molinos de Venezuela S.A., built with the financial and technical assistance of the Argentine concern, Bunge and Born, Ltda., was recently inaugurated in Venezuela. The new mill occupies a 12-floor building, and is said to be fitted with the most up-to-date equipment in the continent. So far, 20 million bolivares have been invested, to be increased to 30 million in the next stage.

The initial production of 7,000 sacks of flour a day (*i.e.* 94,600 tons a year) covers over 50% of the country's total consumption, estimated at 4 million sacks a year.

In addition to flour, the plant will have a daily output of 135 tons of by-products for use as animal feeds which will be more easily available to farmers than when they were imported.

Technical Press Review

September

Dairy Engineering.—Improving Shelf Life of Milk and Milk Products—1; New Methods and Materials for Packaging Dairy Products; Vacuum Forming; Packaging Exhibition Preview; Profile of an Australian Co-operative Dairy; Bulk Handling.

World Crops.—Plantation Equipment: The Russian Tea Industry; The Machine in Tropical Agriculture—1; Preparing Land for Cocoa in Ghana; Chemical Taints in Arabica Coffee.

Manufacturing Chemist.—Packaging: Review of Packaging Exhibition; Labelling and Sealing Packed Merchandise and Products; Chemical Protection Against Radiation; Determination of the Moisture Content of Gelatine and Animal Glue; Use of Electronics in Pharmalogical Research.

Petroleum.—Some Geological and Geophysical Methods for Modern Oil Exploration; Oilfield Development—4; Chromotographic Analysis and Oil Exploration; Hard-facing of Drilling Gear; Instrumentation in the Petroleum Industry; East Europe's Petroleum Plans.

For specimen copies write to Leonard Hill House, Eden Street, London, N.W.2.

Dominican sugar refining

The first 7,000 tons of sugar ever to be refined by a Dominican company have been shipped to New York as part of a 12,000 tons order. The Porvenir refinery of the Azucarera Haina company at San Pedro de Macoris is producing the new *Eversweet* brand sugar. A report on samples by the New York Sugar Trade Laboratory stated that the sugar is of very high quality.

Hungarian food trend

Consumption of meat, butter and cheese is reported to have risen sharply in Hungary over the past few years. And less bread is being eaten.

Figures given by Food Minister Imre Kovács show that 50% more butter and 35% more cheese was eaten last year than in 1955. The amount of meat eaten per year by the average Hungarian rose from 72 lb. before the war to 101 lb. last year.

Sharpest rise has been in the consumption of beer. In 1932 less than 4 pints of beer per head of population were drunk, but last year the figure was more than 50 pints.

Glucono-delta-lactone tests

Glucono-delta-lactone has been available commercially to the U.S. food industry for over twenty years but, until recently, its use in foods has been limited to specific small quantity usage in such products as bland-flavoured sherbets, and to reduce fat absorption in waffle cones and doughnuts. Now the U.S. Armed Forces are engaged in a development programme to provide a chemically leavened bread mix which will produce bread without the conventional yeast fermentation and proofing steps. The acidulant of choice in the chemical leavening system of this bread mix is glucono-delta-lactone.

Published reports of this work have created a new interest in this acidulant, not only for the bread mix, but in many other baked products. Because of the slow hydrolysis rate of g.d.l. in cold water, little acid is formed during cake batter preparation, with a resulting small loss of carbon dioxide in this stage. The main release of carbon dioxide occurs at the elevated temperatures of the baking cycle, which is the ideal time. Also, since the acid is formed at a controlled even rate, the carbon dioxide is evolved at an even rate, producing a texture in the baked product of small, even air sacs.

Correspondence

Role of Consultants

SIR,

As a practising consultant I was pleased to read the article on "Consultants in the Food Industry" in your June issue. I am inclined to think, however, that after reading this article, manufacturers will be left with the impression that consultants are, in general, elderly men who have spent nearly a life-time specialising in one field of an industry. Indeed the writer seems to be advocating this when he states that in his opinion the majority of all independent consultants in the future will be highly specialised. I very much hope this will not be the case and indeed I doubt that such a state of affairs will arise.

In my opinion such over specialisation is detrimental to the consultant and of only limited use to the industry. I am sure there is greater scope for what the writer called the "all purpose" (food of course) consultant and more particularly from the food firms who cannot afford a full-time chemist or investment in a laboratory.

It should not be imagined, however, that the "all purpose" consultant is necessarily a Public Analyst or that the F.R.I.C. Branch E is a qualification purely in the "Analysis of Foods and Drugs." Those passing the Branch E qualification, and they are few in number, must, in addition "show a *special* knowledge of the origin, composition, commercial preparation and preservation of food" and also "must be conversant with relevant legislation, especially with the provisions of the Food and Drugs Acts."

It is not surprising therefore that the Branch E chemist is in great demand by the larger concerns in the food industry. In addition to his specialised knowledge he is of course qualified on a par with the Public Analyst and this has obvious advantages. The number of such highly qualified food chemists is relatively small, only approximately 450, or less than 10%, of all F.R.I.C.'s being qualified in Branch E. Nevertheless those wishing to engage such a scientist can find consultants in the manner outlined in your article. Many Public Analysts are also consultants, but manufacturers can perhaps be excused if they think of the Public Analyst as the "nigger in the wood pile." The very nature of his appointment means that the Public Analyst owes allegiance to the public

The writer is firmly of the opinion that what the food industry requires is a laboratory in every factory, however small the factory. Scientific methods of production and control are essential to prosperity and the ever increasing flow of food legislation means more laboratory work if the manufacturer is to be sure that his products comply with the law.

Such an ideal state of affairs is not possible for various reasons, the chief one being as pointed out in your article that even the smallest type of works laboratory will cost a few thousand pounds a year today. However, consultants highly qualified in food chemistry and with fully staffed and well equipped laboratories are available and willing to give daily scientific services which would, in effect, be equivalent to having a laboratory in the factory. The cost need be no more than the salary of one chemist, and could be less.

Far from there being limited scope for such consultants, the demand will undoubtedly increase and in consequence the demand for consultants highly specialised in a limited field will also increase.

"CONSULTANT."
(Name and address supplied.)

Consulting Association—a clash of views

SIR,

I have read with interest the article "Consultants—their role in the Food Industry" in the June issue.

Undoubtedly firms possessing no laboratory of their own can profit from the assistance of an appropriate consultant (and here one may mention that chemistry is not the only science on which advice may be needed).

An additional point that might be made is that even where a small control or research laboratory exists, its staff can often produce far more effective work if given the opportunity of discussing their problems at regular intervals with a visiting advisory consultant who is a specialist in their field.

Other ways in which a consultant can be of service are well summarised in the article referred to. As regards the new Association of Consulting Scientists, it should perhaps be made clear that this is not yet a fully representative body. Whether it will ever become so will of course depend on how wisely it develops.

Independent consultants are usually strong individualists, and loth to surrender any of their independence. Many are still dubious about the advantages—to their clients and to themselves—of any "organisation" other than that already provided by their professional institutes.

Possibly all will in time be converted. A character in a recent American novel is the despair of his teen-age daughter because he refuses to buy scented after-shave lotion. "Don't you *want* to be like everyone else, Daddy?" she cries plaintively.

"ANOTHER CONSULTANT."
(Name and address supplied.)

pH of Pig Muscles

SIR,

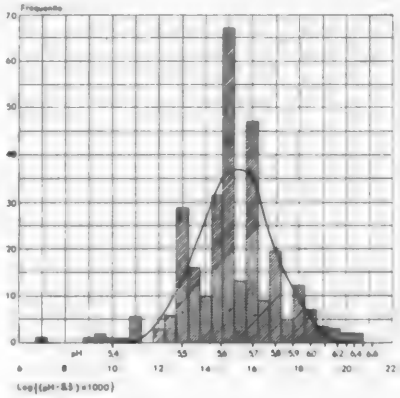
In his elaborate work on electrical stunning of pigs, Blomquist made some remarks on the skew frequency distribution of the *p*H values found.[1] We made comparable *p*H measurements in several muscles of CO_2 anaesthetised pigs 24 hr. after slaughter and our figures are in agreement with the author's although we found a normal distribution if we put the frequency against the logarithm of the deviation of the *p*H from the "approximate isoelectric *p*H" of the particular muscle under review. This gives the possibility of calculating a standard deviation.

At the same time we can get a better picture of possibly occurring abnormalities. An excessive amount of low values as a result of an increase of cases of "myopathie exudative depigmentaire"[2] will become evident from an increased frequency in the utmost part of the left wing of the curve. On the other hand excessive exhaustion of the pigs on their way to the killing floor,[3] gives rise to increased frequencies on the extreme right hand side of the curve.

The graph below shows the mentioned *p*H deviation of m. semitendinosus.

About 50% of the *p*H values are localised within −0·67 and +0·67 of the standard deviation.

J. H. LUIJERINK
N.V. Zwanenberg Research Laboratories, Holland.



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1. Sv. Mogens Blomquist. "Some Observations on the Electric Stunning of Pigs—3." *Food Manufacture*, 1959, **34**, 21.
2. M. Henry, J. D. Romani et L. Joubert. "La Myopathie exudative depigmentaire du porc." *Revue de Pathologie Générale et de Physiologie Clinique*, 1958, **696**, 355-95.
3. Hans Jurgen Ludwig. "Das Blutbild transporermüde Schweine." Diss. Berlin, 1956.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

815,741. T. AND T. VICARS, LTD., and G. F. C. GOFF: Apparatus for cutting and impressing dough.

815,805. J. J. BLOW. LTD.: Milk cooling apparatus.

816,202. DE BATAAFSCHE PETROLEUM MAATSCHAPPIJ N.V.: Ethylene dibromide preparations and method of treating fruit therewith.

816,677. BRAUNSCHWEIGISCHE MASCHINENBAUNSTAL A.G.: Apparatus for the progressive treatment of liquids—for example, sugar juices—with other liquids and gases.

ABSTRACTS OF BRITISH PATENTS

One piece paper container

An apparatus and a method for making a cup-like container from a single piece of paper are described, which comprise gathering the bottom portion of a tube rolled from the paper to form a pleated base and a central pillar which is finally formed into a central button.—812,967. *Lily Cups Overseas, Ltd.*

Pudding compositions

A pudding composition which, when stirred with cold milk and allowed to stand, gives a pudding having a similar texture and consistency as a cooked starch pudding, comprises pregelatinised starch, a di-alkali pyrophosphate milk protein coagulant, a tri-alkali orthophosphate coagulation accelerator, and sugar. Preferred compositions contain 1-10% of the sodium salts of the coagulant and accelerator.—813,725. *Monkhouse and Glasscock, Ltd.*

Food products

Small dumplings, known by their Italian name of "gnocco" or "gnocchi," are prepared by mixing wheaten semolina with a dry starch, heating the mixture of dry ingredients, adding boiling water, and kneading to form a dough which is then separated into pieces which are finally dusted with flour and left to cool.

The gnocci of the invention retains its white colour during storage for a longer period than previously known types and the danger of pieces sticking together during storage is reduced. It is preferred to use a dry potato starch.—813,731. *G. Fioravanti.*

Smoking of foodstuffs

Smoke particles are deposited uniformly on foodstuffs by imparting an electrostatic charge to the smoke particles in an intense electrostatic field and then depositing the particles on to the foodstuff in the absence of any external electric field.

In one embodiment of the invention, the foodstuff is brought into contact, in a chamber having no external electric field, with the smoke particles which have been electrically charged by subjecting them to an intense electric field in a second chamber.—814,121. *N.R.D.C.*

Blanching or pre-cooking

Claims a method and apparatus for blanching peas, beans or the like, which comprises continuously passing the peas, which may be fresh, dried or soaked, through a preheated aqueous liquid in a vessel at such a rate that, when the peas leave the treatment vessel, they are sufficiently blanched. The peas are discharged from the vessel through a rising conduit opening into the bottom of the vessel and passing to a device where the peas are separated from the liquid, which is then recirculated. This discharge conduit at no point rises above the liquid level in the treatment vessel and, as a result, always contains both peas and liquid.—814,871. *Mitchell Engineering, Ltd.*

Blanching or pre-cooking

A method and apparatus similar to those claimed in 814,871 are disclosed, but in this invention the peas are passed countercurrent to steam, being sprayed with sufficient water to maintain a surface film thereon. The treated peas are separated at the base of the treatment vessel and the separated liquid can be re-used to pre-soak more peas or may be recycled to the treatment vessel.—814,872. *Mitchell Engineering, Ltd.*

Abstracts of British patents have been taken from published specifications by permission of the Controller, H.M. Stationery Offices. The full specifications are available from: The Patent Office, 26, Southampton Buildings, London, W.C.2. Price 3s. 6d.

New Companies

Bow Produce, Ltd. (631258.) To carry on the bus. of preparers of foodstuffs, packers and canners of meats, etc. £100. Subs.: Jeffrey Milston, 150, Green Lane, Edgware, and David Woda.

W. Eddy and Sons, Ltd. (631292.) 6, Belle View Terrace, Penzance, Cornwall. Mnfrs. of and vendors of soft drinks, ice cream and soda fountain drinks, etc. £2,000. Dirs.: W. A. Pierce and J. K. Procter.

F. Dyson and Son (Bakers), Ltd. (630029.) 344, Blackmoorfoot Road, Crosland Moor, Huddersfield. To take over the bus. of baker and confectioner cd. on at Blackmoorfoot Road and Park Road, Crosland Moor, Huddersfield, by Clifford Dyson, etc. £10,000. Dirs.: Clifford, Geoffrey N., and Mrs. Amy Dyson.

M. and M. Jaconelli (Streatham), Ltd. (631170.) 90-91, High Holborn, London, W.C.1. Mnfrs. of and dlrs. in ice cream, chocolate, boiled and other sweets, etc. £2,000. Dirs.: Margaret and Maria Jaconelli.

Lowe Bros. (Cardiff), Ltd. (630785.) 1, Fairleigh Road, Cardiff. Mnfrs. of and dlrs. in aerated and mineral waters, etc. £5,000. Dirs.: Albert, Edna and Albert D. Cheetham, and Barbara Sanson.

Maycorn Dairy Co., Ltd. (630231.) 54, Rugby Road, Binley, nr. Coventry. £10,000. Dirs.: Chas. F. Chillingworth and Wm. R. Masters.

J. J. Sandham, Ltd. (630284.) Rostock Villa, Barton, Preston. Mnfrs. of and dlrs. in cheese, butter, etc. £10,000. Dirs.: John J., Robert C. and Martha Sandham, and Barbara Parker.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Trade Marks

DENOL.—783,199. All goods included in Class 29. **De Nordiske Fabriker De-No-Fa Aktieselskap,** Prinsensgate 2, Oslo, Norway.

SILVER QUEEN.—783,989. Canned fish. **Hoem Canning Co., A/S,** Strandgaten 14, Bergen, Norway.

IVORY TOWERS.—784,157, and **TARRALEE.**—784,726. Fruits, vegetables, meat and meat products (for food), all being canned; and jam, marmalade, fruit preserves and vegetable preserves. **Lakeland Food Industries, Ltd.,** Solway Estate, Maryport, Cumberland.

MERRY ENGLAND.—778,280. Biscuits (other than biscuits for animals). **Burton's Gold Medal Biscuits, Ltd.,** Weston Centre, Berkeley Square, London, W.1.

ROYAL STAR.—779,415. Biscuits (other than biscuits for animals) and farinaceous preparations for food for human consumption. **Wright's Biscuits, Ltd.,** Rutland Street, South Shields, Co. Durham.

SAFARI.—782,706. Non-medicated sugar confectionery in tablet form. **J. Harradine and Sons, Ltd.,** Preserve Works, St. James Road, London, S.E.1.

TWO-TIMER.—782,829. Ice cream, ice cream confections, mixtures for use in making ice cream and water ices. **J. Lyons and Co., Ltd.,** Cadby Hall, London, W.14.

TOYSHOP.—782,991. Biscuits (other than biscuits for animals). **Chiltonian, Ltd.,** Manor Lane, Lee, London, S.E.12.

HEADS & TAILS.—785,982. Biscuits (other than biscuits for animals). **Symbol Biscuits, Ltd.,** Sunya House, Scrubbs Lane, Willesden, London, N.W.10.

DAWNGLOW. — 786,324. Seasonings. **William Douglas and Sons, Ltd.,** Douglas Wharf, Putney, London, S.W.15.

BONVISI.—786,659. All goods included in Class 30. **Cereal Manufacturing Co. (Chelsea), Ltd.,** 15, Lots Road, London, S.W.10.

BAMBI.—776,114. All goods included in Class 29. **Culrose Foods, Ltd.,** Culrose House, 100, Tooley Street, London, S.E.1.

BULGURT.—785,581. All goods included in Class 29. **Svenska Aktiebolaget Remedia,** Wahrendorffsgatan, 1, Stockholm, Sweden.

PIPOCREAM.—786,577. Cheese. **French Dairy Farmers, Ltd.,** 299, Fulham Road, London, S.W.10.

TOLGATE.—787,101. All goods included in Class 29. **James P. Thol (Ingredients), Ltd.,** Dominion House, Fenchurch Street, London, E.C.3.

PALATA.—777,405. Edible oils and edible fats. **Van den Burghs and Jurgens, Ltd.,** Unilever House, Blackfriars, London, E.C.4.

CABER.—778,751. All goods included in Class 29, but not including edible cream, condensed milk, butter or cheese, and not including fish or any goods of the same description as fish. **Minsterley Creameries, Ltd.,** Minsterley, Shrops.

ROSE OF TRALEE.—779,245. All goods included in Class 29. **Co-operative Wholesale Society, Ltd.,** 1, Balloon Street, Manchester.

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

Lighting-1

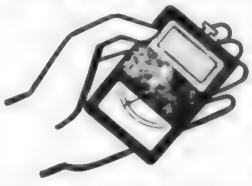
Good lighting affects productivity in three ways, (1) by directly increasing the speed of working and reducing errors and wastage, (2) by improving overall factory efficiency through better supervision and housekeeping, (3) by providing better working conditions, thus improving labour relations and avoiding frequent changes of workpeople.

It is not possible to judge by the eye alone whether the lighting in any factory is good enough to serve these purposes because the eye has a tremendous range of adaptation (vision of some kind is possible within an illumination range of 1,000,000 to 1) and is hence an unreliable measuring instrument. Severe mental and eye strain or unconscious slackening of working speed may occur under lighting which *appears* to be adequate.

The only reliable way to appraise factory lighting is to conduct a lighting survey using a lightmeter, an inexpensive instrument which measures the actual illumination available. These figures can then be compared with official recommended values for the various tasks.

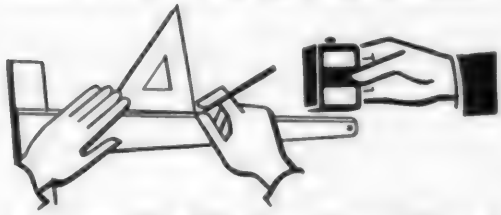
Lighting Survey

A methodically conducted lighting survey is the first step towards achieving good productive lighting. The average artificial illumination at working height should first be measured. This requires a number of readings at various positions relative to the lighting fittings, particularly beneath and between fittings and by the wall. The average of the readings should then be compared with the illumination values recommended by the Illuminating Engineering Society. The following is a general guide to illumination requirements.



NATURE OF WORK, PROCESS OR MATERIAL	ILLUMINATION LUMENS/SQ.FT.
Rough or routine work. Large detail. Medium to light material of good contrast.	7
As above, but work rather more skilled or critical.	10
Ordinary work usually involving workers' inspection. Medium detail and contrast.	15
Fairly critical work, fairly small detail or poor contrast.	20
Skilled work, small detail or dark material.	30
Fine or critical work, very small detail, very poor contrast or very dark material.	50
Very fine exacting work.	100
Minute work.	200

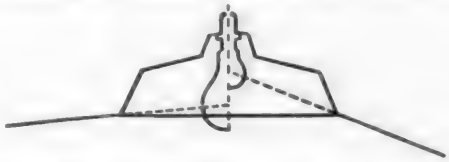
In addition, readings should be taken at selected working points with the lightmeter so placed that it measures the light on the work while the operative



is working. This will indicate whether full use is being made of the light or whether shadow is obscuring part of it.

Glare

Any direct light on the eye tends to reduce its sensitivity—thus reducing the power to see. Increasing the intensity of the light source may



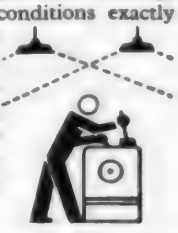
therefore not improve matters unless care is taken to avoid glare either by correct positioning or by the use of correctly matched reflectors and lamps.

Walls and Ceilings

Certain surfaces and certain colours absorb light and therefore do not make the best of a light source; others reflect light and, so to speak, feed back on to the work a portion of the lighting which would otherwise be lost. Bright walls, moreover, have a good psychological effect which makes for contented —and therefore productive—operatives.

Shadows

Unnecessary shadows may seriously slow down work and also cause accidents. Lightmeter readings should always be taken under conditions exactly similar to those obtaining while work is going on. The operative himself may mask his work, an overhead crane or a heavily loaded conveyor belt may periodically obscure a light fitting, or a dust-laden atmosphere may reduce the designed lighting values.



For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2. Telephone: TEMple Bar 9434.

Excellent reference books are available on electricity and productivity (8/6 each or 9/- post free)—"Lighting in Industry" is an example.

E.D.A. also have available on free loan in the United Kingdom a series of films on the industrial uses of electricity including one on industrial lighting. Ask for a catalogue.

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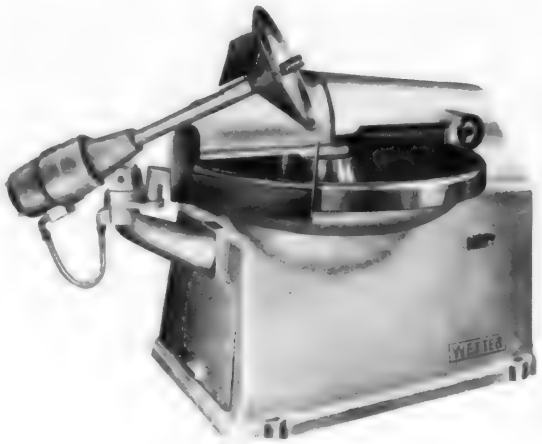

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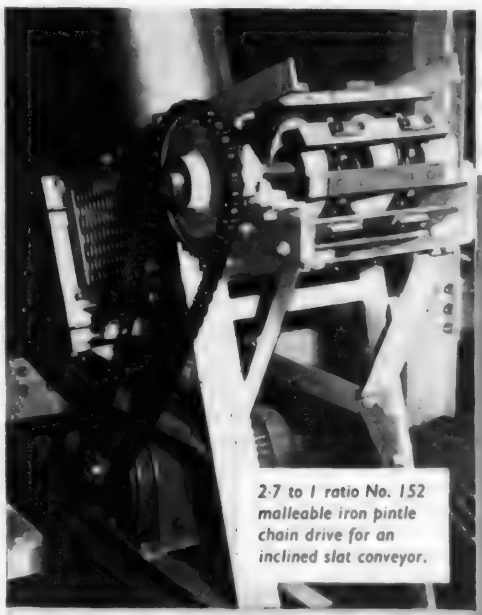

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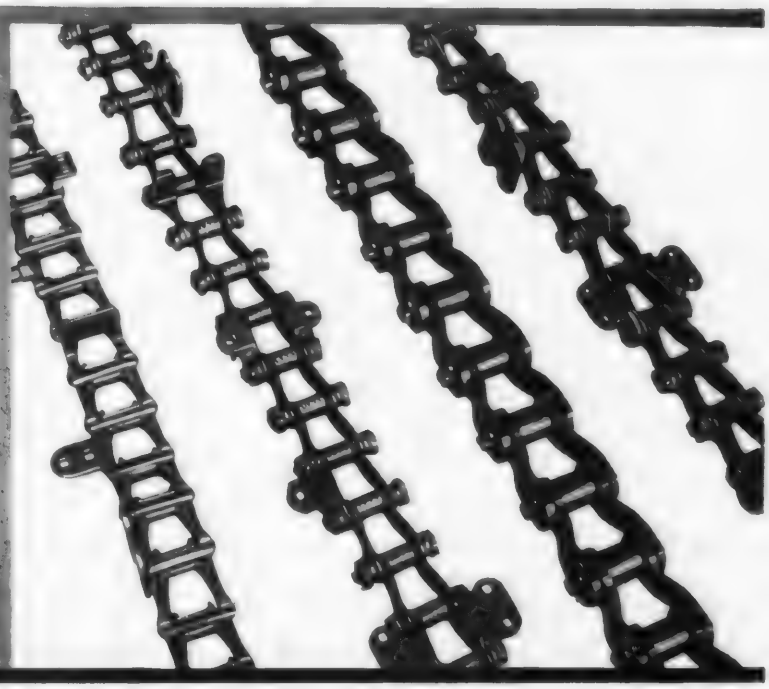

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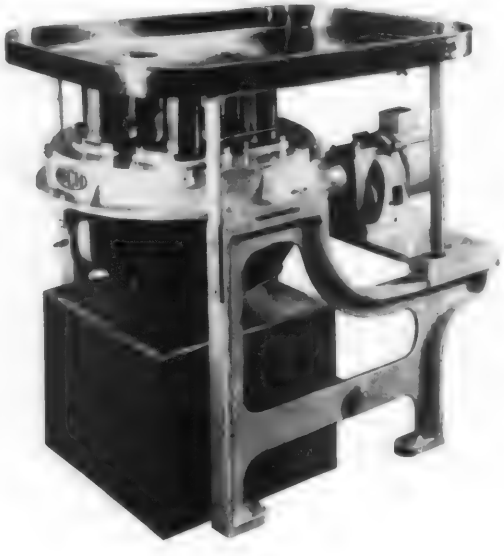

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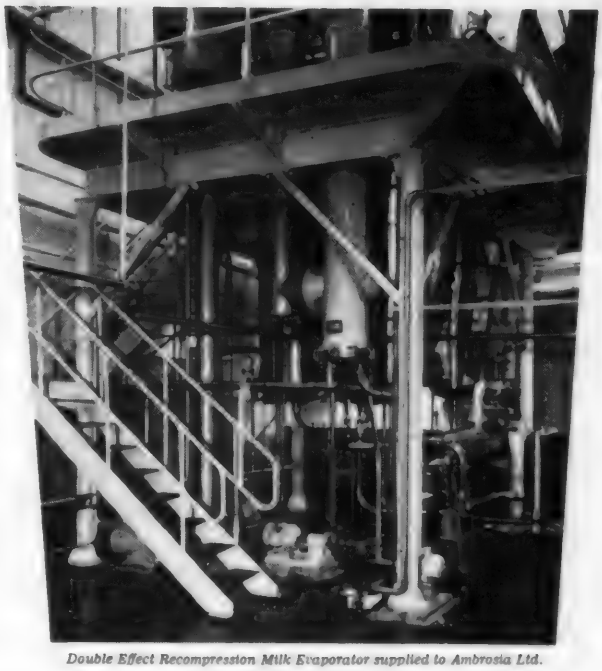

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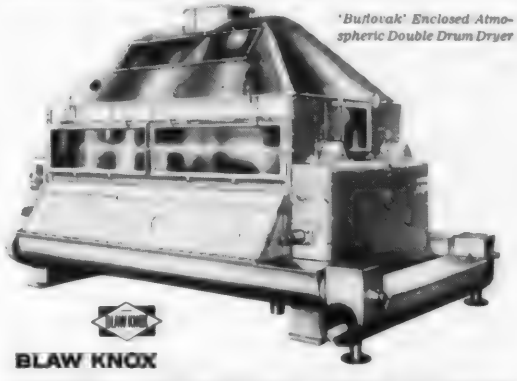

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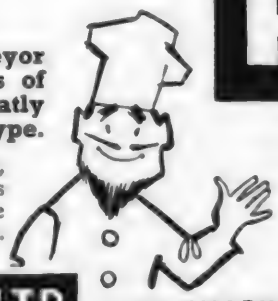

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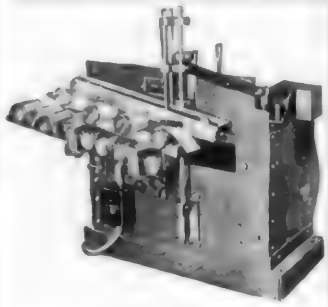

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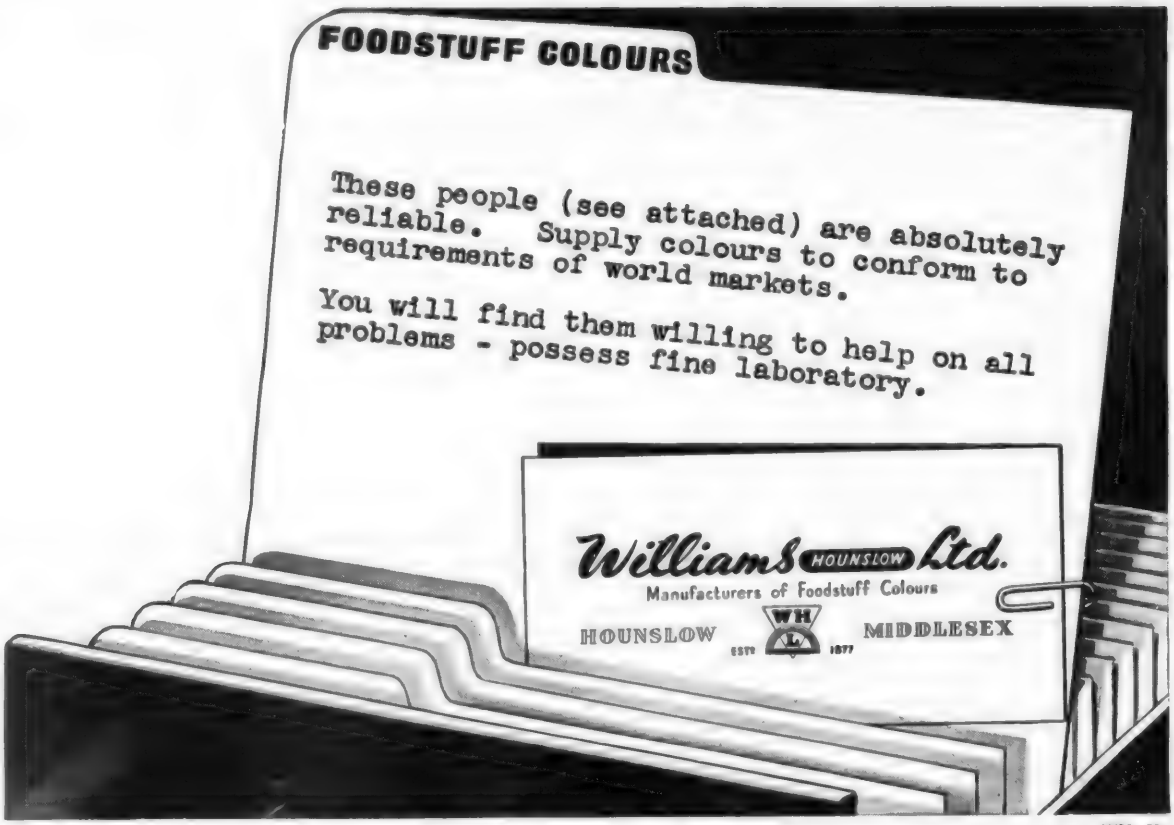
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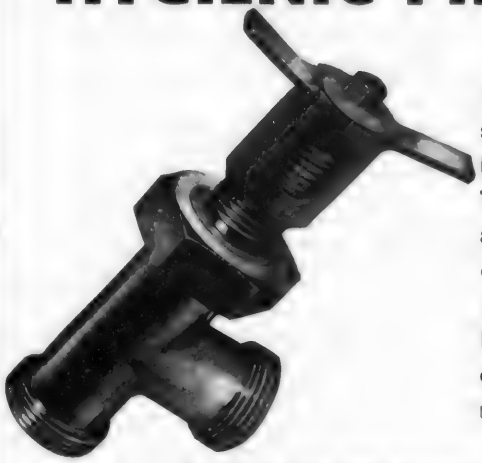

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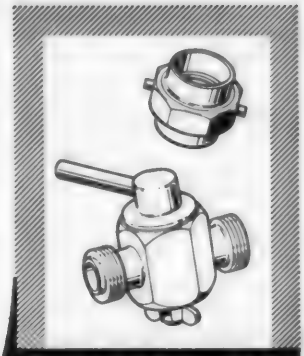

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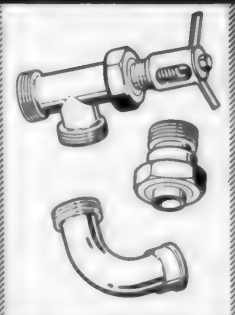

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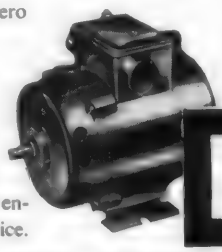

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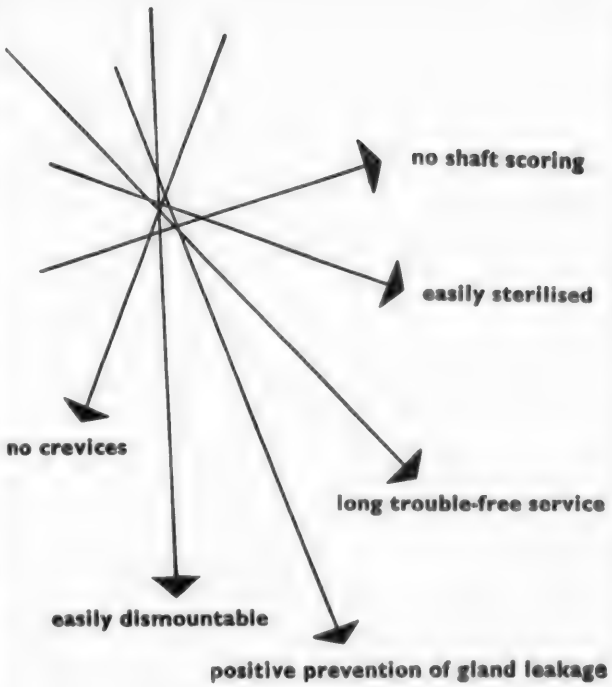

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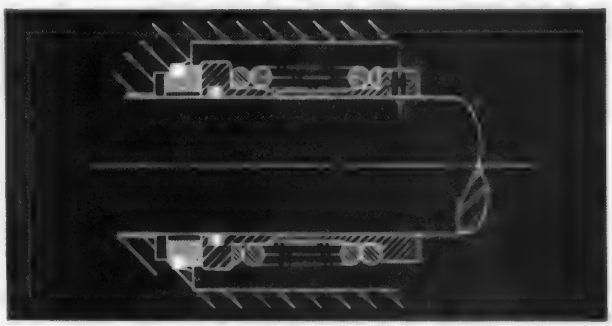

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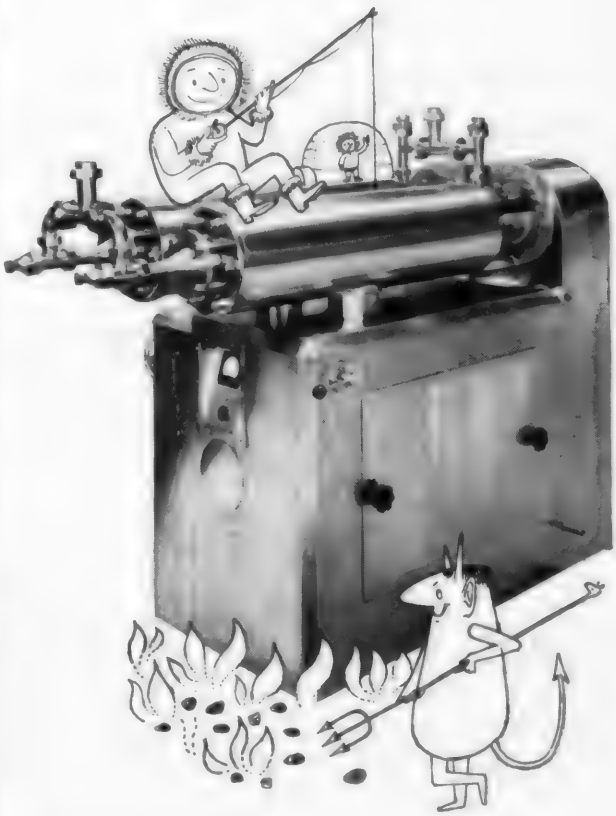

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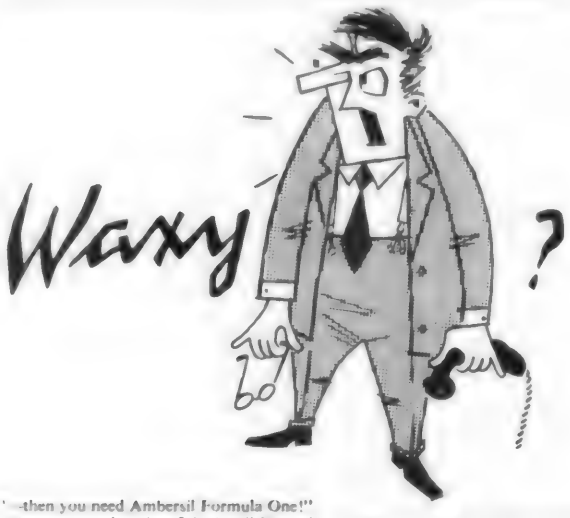

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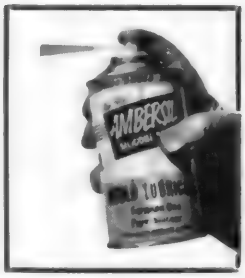

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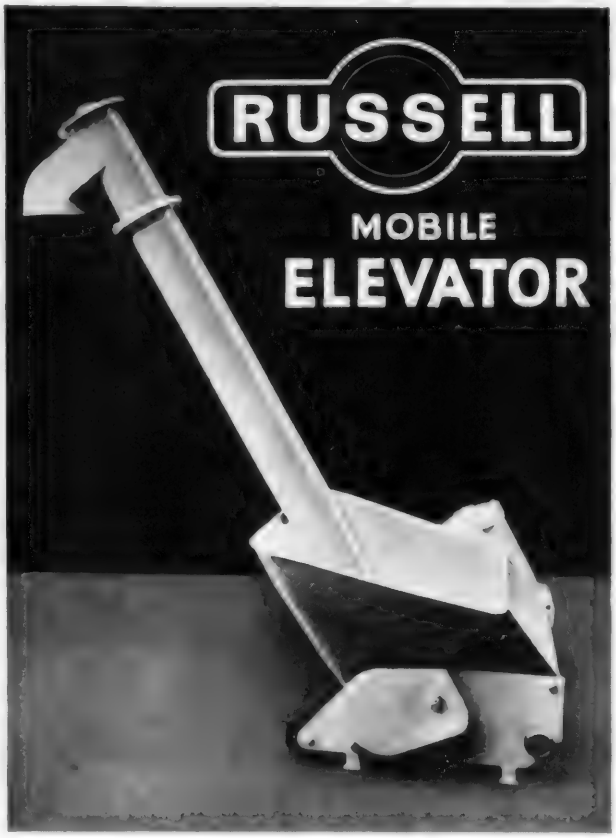

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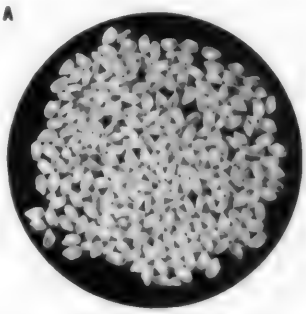

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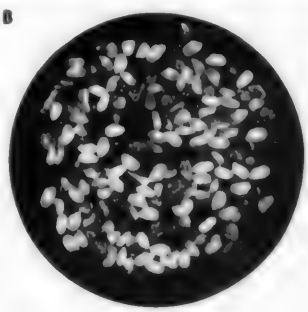

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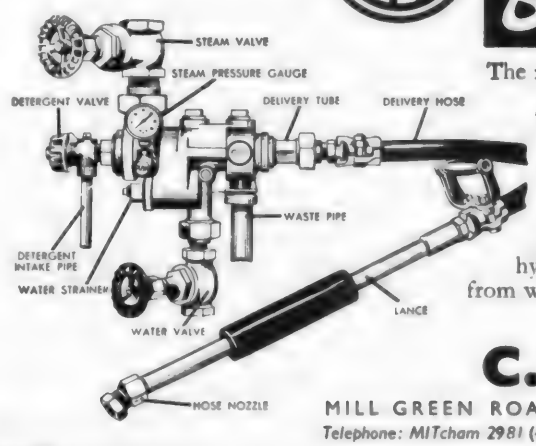

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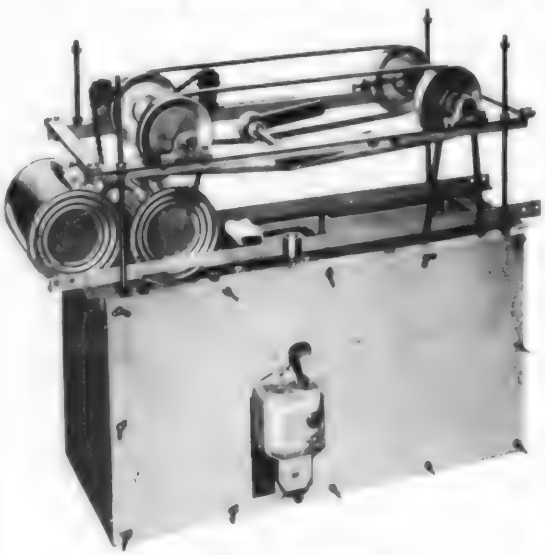

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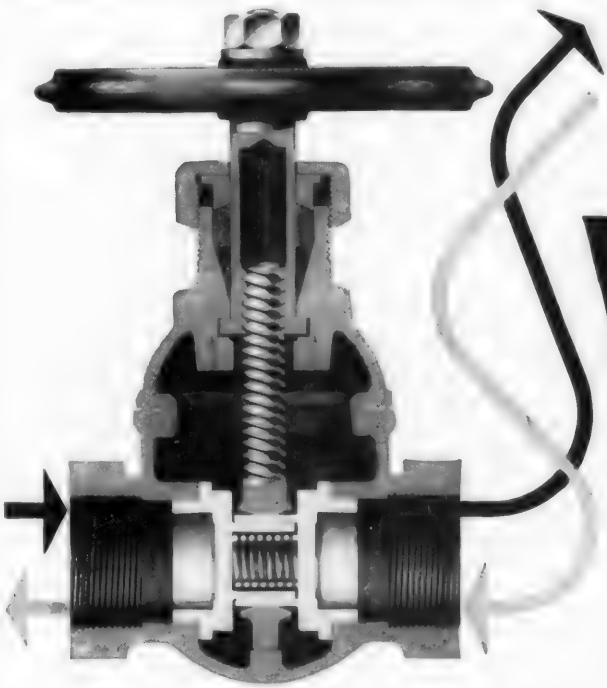

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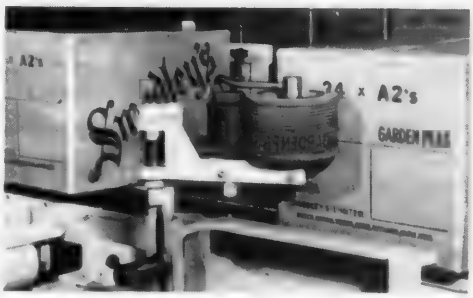

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Will automatically imprint code-date or contents on large or small cartons or paper sacks. Several models available. Uses BASELOCK rubber type in any size.

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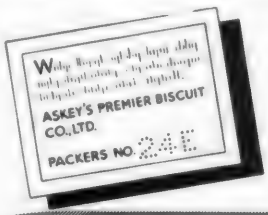

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PRODUCTION Supervisor required for Meat Canning Factory in Wiltshire. Experience in canning all kinds of meats necessary.—Box B5880, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

WILLIAM Evans and Co. (Hereford and Devon) Ltd. require a Works Manager, preferably with experience in the food industry. Applicants should be not under 30 years of age, and preferably not over 40. Preference will be given to applicants who are either qualified Chemical Engineers or have a Chemical Engineering background. Salary according to age and experience. Pension scheme. Accommodation available. Replies treated in strictest confidence.—Apply Managing Director, Widemarsh, Hereford.

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ASSISTANT Factory Manager required for Meat Pie Bakery, S.W. London. Applicant must be used to mass production methods, and capable of controlling over 300 mixed staff. Previous technical experience essential. Person under 40 years of age will be given preference. Excellent salary offered. Contributory Pension Scheme.—Write giving fullest details to Box B5886, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

AN East Anglican company require Junior Draughtsman, preferably with experience in Flour Milling Plant or similar Food Processing Plant layout.—Apply giving full details to Box B5861, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

PRODUCTION Manager required by manufacturers of jam, marmalade, etc. Excellent opportunity for ambitious person who has necessary technical experience. Knowledge of modern equipment and methods essential. Pension scheme. Applications, which should give full particulars of age, experience and starting salary required, will be treated as strictly confidential.—Box B5847, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

ENGINEERING company in East Anglia requires Draughtsman. Applicants with sound knowledge of Flour Milling and Provender Plant layout preferred, but experience in installation of general Food Processing and similar Plant considered.—Full details should be sent to Box B5862, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

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PATENT No. 722294, *Food and Beverage Mixer* for sale or licence.—Apply, Chatwin and Company, Chartered Patent Agents, 253, Gray's Inn Road, W.C.1.

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PATENT No. 705,243, *Can-opening Key* for sale or licence.—Apply Chatwin and Company, Chartered Patent Agents, 253, Gray's Inn Road, London, W.C.1.

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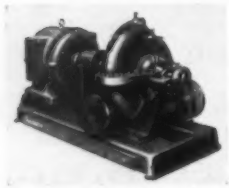

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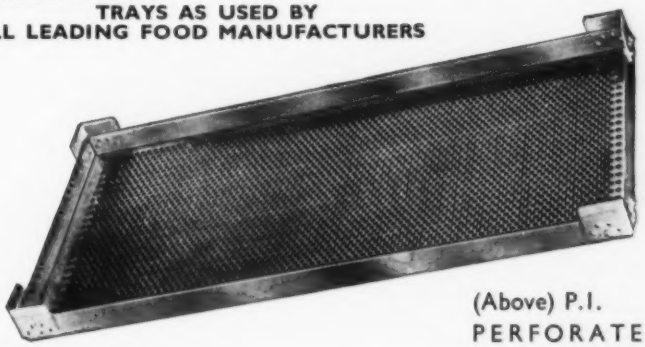

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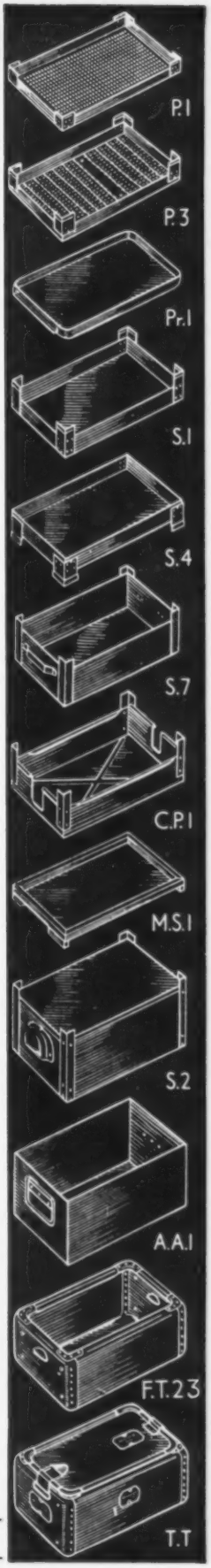

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